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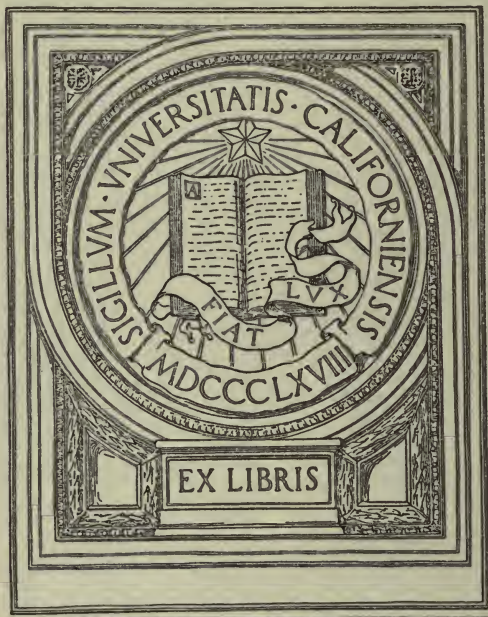

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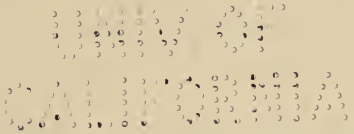
MORAL TEACHINGS OF SCIENCE

BY

ARABELLA B. BUCKLEY

(MRS. FISHER)

AUTHOR OF THE FAIRYLAND OF SCIENCE, THROUGH MAGIC GLASSES, LIFE AND HER CHILDREN, WINNERS IN LIFE'S RACE, A SHORT HISTORY OF NATURAL SCIENCE, ETC.



Everything in nature acts according to laws; the distinction of a rational being is the faculty of acting according to *consciousness* of laws.

KANT.

Thus the reproach is removed of laying the foundation of the noblest part of our nature in the base principle of selfishness. . . .

DARWIN, *Descent of Man.*

NEW YORK

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1892

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PREFACE

The six chapters which form this little volume were written in 1890 for the *Chautauquan*. Five of them only were published, owing to want of space, and some of these were curtailed. I have now been asked to republish the whole, and in so doing I have restored all the original passages and added some others. In the main, however, the chapters remain as at first written, and, though the necessity for brevity has caused some points to be assumed which, in a larger treatise, would have been more fully explained, it has, perhaps, the advantage of appealing to many readers who would not take up an elaborate philosophical work.

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It is for such persons that the book is intended — namely, those who, feeling puzzled and adrift in the present chaos of opinion, may welcome even a partial solution, from a scientific point of view, of the difficulties which oppress their minds.

ARABELLA B. BUCKLEY.

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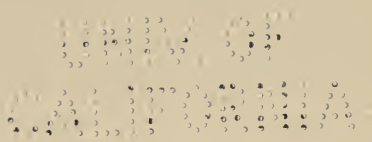

MORAL TEACHINGS OF SCIENCE

CHAPTER I

"Can the stars' motions give me peace,
Or the herbs' virtues mine increase?"

COVENTRY PATMORE.

"Our understanding cannot in this body found itself but in sensible things, nor arrive so clearly to the knowledge of God and things invisible as by the orderly conning over the visible and inferior creation."—MILTON.

LET me beg of the reader not to pass lightly over the two quotations at the head of this article, for he will find in the second a noble and earnest answer to the first, though written two hundred years before it; and upon this answer will be grounded the arguments of our Science Teachings, in which we propose to consider how far science, or the study of the world outside ourselves, can help and guide us in the

conduct of our life. That we want help, no one can doubt who looks around upon the turmoil of opinions in our day, the breaking down of old barriers, the rebellion against authority, and the confusion of men's notions of right and wrong. The very fundamental principles of religion and morality are often called in question—whether there be a God, and if there be one, whether He is omnipotent and benevolent; whether this life is all, or a preparation for a better one; whether it is best to be just and merciful, self-sacrificing and loving, or whether self-interest and selfish enjoyment are the end and aim of existence.

Nor are these questions mooted only by men who wish to make them an excuse for self-indulgence and vice. We live in an age of earnest scepticism, when thoughtful people of every class are filled with a passionate desire for truth at all costs; they imperatively demand a reason for the doctrines that are presented to them, and will act only upon sincere personal convictions, however crude these may be. The very leaders of knowledge are sharply divided in opinion. Theology is now studied as a science, and points are disputed, which in the age of our forefathers were accepted without

discussion; while the rapid spread of scientific discovery has discredited many dogmas of earlier days, under which, nevertheless, deep truths are hidden. Those who are gradually tracing out, step by step, unvarying law and order in the universe, cannot accept much which was readily believed before the immutability of natural law was either known or suspected; while those who have not made natural laws their special study, are pained and shocked at being called upon to reconsider deeply-rooted and cherished beliefs.

Now all this would not in itself be hurtful, if belief were not needed for everyday conduct. So long as both sides are seeking truth, they are certain in the end to rise above the clouds of confusion into the higher regions where all broken lights merge into one. But life consists in action, and for right action men need steady principles. All people are not earnest, and even many who are, cannot think out their own standpoint, but accept the prevailing thought of the day; and to these people a conflict of opinions concerning the higher questions of religion and morality becomes actually harmful. Perplexed, and weary of the constant discussions upon the most fundamental truths, they throw aside all

belief in disgust; the better minds sink into perplexity and doubt, the meaner ones follow their selfish instincts without restraint. A correspondent from one of our colonies wrote the following sentence a short time ago in connection with a sad crime which had been committed: "The great danger in our day is that young men have no fixed principles to guide them; religion has lost its hold, and with it have gone the religious sanctions of morality. Right and wrong are becoming with them mere matters of expediency, a calculation as to what will best serve their ends."

Surely this is a very serious state of things, and one which cannot be cured by an appeal to doctrinal teaching, for the very root of the difficulty lies in the fact that the religions of the present day have ceased to influence many minds. In this dilemma it may be well to remember that there are two ways of approaching every question, from within outward, or from without inward. The first of these, the study of man's inner nature, has been from the earliest times the groundwork of religion and philosophy. The second, the study of the outside world, and of man's physical nature, has

been the acknowledged domain of science. Yet these are not really two, but only different methods of arriving at one result, namely, the knowledge of the laws by which we and all the rest of nature are governed. If then the first seems to fail us, why should we not inquire whether the second will not afford us a firmer standpoint?

No doubt the higher questions of theology must always remain matters of inference and faith rather than of direct proof, though even these may be made more clear by "orderly conning over the visible and inferior creation." But our relations toward our fellowmen belong to this world and to our present daily life, and are intimately bound up with the whole history of living beings upon the earth. On this point, at least, science has a right to speak, and if we only desire to arrive at the truth we shall inquire fearlessly.

What we want is a sure and intelligible basis on which we can take our stand in the work of life. If selfishness is the universal law of progress, then the sooner we learn the truth the better. But if this is not so, we need have no fear that the study of natural laws will mis-

lead us into believing it. With our limited knowledge we may often be perplexed, but so long as we do not overstrain the facts we shall not be confounded. If it be true that the instincts which lead us to be just and merciful, honest and unselfish, pure and affectionate, to fear moral degradation and to aspire to nobleness of character, are inherent in the very laws of our being, then we shall find the gradual development of these qualities in the groundwork of living nature. In a word, we shall find evidence that high moral duties are not true merely because all religions have taught them, but that all religions have taught them because they are true.

If we can establish this conclusion, though much must remain uncertain so long as our view is so limited, yet we shall have found firm ground upon which the scientific and religious sanctions of morality meet, affording a bulwark against the flood of scepticism as to all things noble and good, which threatens to overwhelm us.

Let us begin then by considering the most general and comprehensive conclusion which the study of science has been establishing for us

during the last four hundred years. This conclusion, which even now is often disregarded by many practical and sensible people, is that the laws governing the universe are constant and unvarying so far as we can trace them. In the childhood of the world, when every event from the rising of the sun to an eclipse or an earthquake was a miracle unconnected with other events, it was impossible for men to learn anything of the true workings of nature; and even long after nations became civilised and very advanced in culture, science lagged behind. The field of accurate knowledge could only be conquered inch by inch by patient observers, and many scattered conclusions had to be formed and registered before they could be united into one system.

Even as late as the beginning of the seventeenth century men still believed that our little world was the centre of all things, and the sun, moon, and stars created simply for our use to give light by day and night; and those who care to examine carefully many beliefs of the present day will be surprised to find how much they are influenced by the survival of this ancient error, as for example when men speak of

the whole scheme of creation, and of the intentions of the Deity as relating solely to our world and its inhabitants. Science, however, was slowly but surely dispelling this illusion. Ptolemy in the time of the Greeks had accurately worked out the movements of the sun and planets on the theory that they moved round our earth. Copernicus in the middle of the sixteenth century was able (precisely because Ptolemy had worked conscientiously and stated the facts accurately, so far as he knew them) to show that he was mistaken, and that our earth, together with the planets, moves round the sun. Then followed the discoveries of Galileo, the observations of Tycho Brahe, and the labours of Kepler, reducing the movements of the planets to definite laws; and finally, towards the end of the seventeenth century, Newton, by the discovery of gravitation, explained why the planets follow these laws, and established a theory of mutual attraction which holds true throughout the whole of the heavenly bodies of which we have any knowledge.

This discovery, which seems at first sight to have little or nothing to do with our inner nature, really gives us the standpoint upon which the

lever of moral action must be placed to move mankind; for it was the thin end of the wedge which has slowly but surely driven out the idea of caprice, chance, and special interference from the universe.

The law of gravitation once established gave a strong impetus to astronomy. Laplace proved that it accounted for all the intricate movements of the solar system; and the mathematical calculations by which Adams and Leverrier discovered the unknown planet Neptune were founded entirely on the fact that the motion of Uranus was inconsistent with the law, unless caused by the attraction of some unseen body. So firm had become the conviction that this law is constant and unvarying in its action!

Meanwhile the stars, too, began to yield up their secrets. Halley and others showed that some stars had shifted their places since the days of Ptolemy, and that they are separated from us by such enormous distances that they must be mighty globes of light. It remained for Sir W. Herschel to prove that many of them are much larger and more brilliant than our sun, which, instead of being the centre of the universe, is one of the smaller stars, and is carrying our solar

system toward a spot in the constellation Hercules at the rate of about half a million of miles a day.

Here, again, we have to give up our pre-eminence. Not only is our earth not the centre of the universe, but even our sun is but a small wandering star among the myriads of heavenly bodies, and we can no longer therefore reason as though the whole scheme of creation had been shaped with a view to the existence of man only, nor as if the concerns and destiny of our world were the end and aim of all things. What we lose on the one hand, however, we gain on the other, for our mind travels out into the universe, and together with our own littleness we learn the greatness and the constancy of the hidden Power which holds us in its grasp.

Yet one more conclusion remains to be noted. It was again the elder Herschel who discovered that the binary stars, such as Castor in the constellation Gemini, are two separate suns revolving round each other; and the mathematicians taking up the problem proved that such stars perform their revolutions in a definite time round a common centre exactly in accordance with the law of gravitation. "Thus," writes Sir

Robert Ball,[1] "a whisper from the binary stars came across the vast abyss of space. That whisper told us that the law of gravitation is not peculiar to the solar system. It told us the law extended to the distant shores of the abyss in which our island is situated. It gives us grounds for believing that the law of gravitation is obeyed throughout the length, the breadth, the depth, and the height of the entire visible heavens."

So much then for the lessons of astronomy, and when we turn to other physical sciences the same truths meet us. In physics as in astronomy all discoveries and applications of the various forces rest upon the conviction, based upon experiment, that their action is constant and unvarying, and that apparent exceptions are due entirely to our ignorance.

Science has been gradually bringing all isolated facts under the reign of law, until at last all the physical forces, heat, light, electricity and magnetism, chemical affinity and cohesion have been proved to be but different forms of energy, or the power of doing work, so that when this energy disappears as light or heat, it reappears

[1] *The Story of the Heavens*, p. 402.

as electricity or chemical affinity, or does work in building up the cells of plants or the tissues of animals. In like manner as we now know that the planets and stars revolve in regular and law-abiding order in the heavens, so we have proved by observation and experiment that the energy producing all physical activity is fixed and unvarying, disappearing in one form only to reappear in another.

When next we turn to the material of which our earth and other bodies are composed, the same conclusion reappears. For spectrum analysis has now shown that iron, sodium, calcium, hydrogen, and many other elements are common to our world, to the sun, and to the most distant stars and nebulæ; obeying there the same conditions and laws as obtain on our globe. Nay, more! the most recent experiments made upon the so-called elements, in our laboratories, tend to lead us to the conclusion that they may be but different forms of one original substance, as heat and electricity are but different forms of energy.

So we are led on all sides to unity and uniformity of action, the apparent irregularities of nature due to our ignorance finding their place one after another as regular modes of manifestation

of a great underlying cause too vast for us to grasp in its reality and entirety. And to this we must add one more inference which is becoming more clear and certain as science moves on—this is that the visible universe which we can examine has not been always as it is in our time, but is the result of gradual evolution and development. Even now spectrum analysis shows nebulæ in which matter is still in a state of gas, others in which stars are apparently forming, while in our own solar system everything points to the probable explanation that our earth and the other planets were once part of the sun and have been left behind during the condensation of the solar nebulæ, revolving around the central orb and gradually cooling down to their present condition. In our world we can carry the history still farther, for we have now traced the gradual development of living beings, the succession of higher and higher forms in the strata of the different geological periods, and the final crowning point in the appearance of man in later ages.

We see then that experience has invariably shown, as our knowledge has increased, that anything apparently capricious, anomalous, and irregular in the working of the visible universe

arises only from our infirmity of vision. The farther we penetrate, the more orderly and regular is the sequence we discover, leading us to a settled conviction that the Will working behind and in the universe is unwavering and constant. "Thus," in the words of Mr. Herbert Spencer, "the consciousness of an Inscrutable Power, manifested to us through all phenomena, has been growing ever clearer, and must eventually be freed from its imperfections. The certainty that on the one hand such a power exists, while on the other hand its nature transcends intuition and is beyond imagination, is the certainty towards which intelligence has from the first been progressing. To this conclusion Science inevitably arrives as it reaches its confines; while to this conclusion Religion is irresistibly driven by criticism. And satisfying as it does the demands of the most rigorous logic at the same time that it gives the religious sentiment the widest possible sphere of action, it is the conclusion we are bound to accept without reserve or qualification."[1]

While, however, we must all freely admit that the *ultimate* nature and attributes of the great First Cause which we call "God" must transcend

[1] *First Principles*, p. 108.

our utmost efforts of intuition or imagination, we cannot surely fail to recognise that partial manifestations of that nature are taking place within and around us at every moment of our lives. To allege, as some able men have done, that it is idle for us to attempt to discern the purposes and will of such a Cause in ourselves, or in the natural world around us, has always appeared to me to create a difficulty where none exists.

No one for a moment supposes that we shall ever form an exact conception of the universe, since every increase in our powers of observation and analysis shows that more and more lies beyond, and that it is impossible to reach the end. Yet this does not prevent us from understanding in a large measure the laws governing the portion we do see, as astronomy, of all the sciences, especially proves to us. In like manner our own existence and that of others is an absolute mystery, and the only available starting-point is our own consciousness, the nature of which is as inscrutable as that of the Deity. Yet we act daily upon our knowledge of the laws of human nature predicting results and finding our judgment correct.

By the same reasoning we can never hope to form an adequate conception of an Infinite First Cause. But those who for this reason would deny us a knowledge of God, seem to forget that the very forces acting in nature, and in ourselves, emanate from God *and would be non-existent without Him.* Whether, therefore, we consider the unvarying law and order of the physical universe, or the intelligence exhibited in the organic world and culminating in the self-consciousness and will of man, we are actually studying those phases in the nature of the First Cause of which these are the expression. On no hypothesis founded upon the facts of nature can we shut out His ever-present action, nor shake the self-evident truth that in Him all existence "lives and moves and has its being;" while every step we take leads us more and more to the conviction that He is "without variableness or shadow of turning."

If then we can understand the working of the laws of the universe even in their lowest and simplest stage, we have just so far entered into the Will of which they form part. If we can guide our conduct by them, we must be moving in the line of least resistance and tending toward

perfection. If by means of them we can arrive at a better understanding of our own infinitely more complex nature, we shall in so far arrive nearer to a comprehension of His infinite and often inscrutable attributes among which must be those from which originated the laws of our being.

Therefore when the poet asks, "Can the stars' motions give me peace?" we must surely answer "Yes." For in these, the most mechanical and therefore the least complex of nature's problems, we invariably find that constancy and stability, which are the foundation of all confidence. As a child in moments of terror looks into its parent's face, and seeing there calm and courage, trusts confidently that all is well, so man in moments of depression and helplessness must surely find rest in the starry heavens, an earnest to him of the great truth that caprice and uncertainty have no place in the universe, but that *his* life too is part of a fixed and stable purpose, emanating from Infinite Knowledge and Power.

CHAPTER II

"All nature is but art unknown to thee;
All chance, direction which thou canst not see;
All discord, harmony not understood;
All partial evil, universal good;
And spite of pride, in erring reason's spite,
One truth is clear, whatever is, is right."—POPE.

FOR a long time after the unvarying action of law had been recognised in the inorganic world, no such generalisation was applied to living beings. Each species of plant and animal was supposed to have been created at the beginning of the world, with a definite structure and habits of its own; and the similarity between the different forms was accounted for by their being all designed upon one general plan by the Creator.

The whole scheme of the living creation, with man at its head, seemed to lie altogether beyond the reach of investigation—God had made the

endless diversity of living forms, but *how* He had made them was a mystery no one even attempted to explain. Nor did the fact of the pain and distress suffered by all animals in the struggle for life and food seem to have caused any surprise. No thoughtful mind could deny that "the whole creation groaneth and travaileth in pain together until now;" but this was believed to be the result of man's fall, and the injustice of such an explanation did not suggest itself.

The first awakening to the extent of our ignorance on these points came from geology, and was a parallel in the world of life to the discovery in astronomy that our world is not the centre of the universe. In the early part of this century man first learnt that there has been a succession of living forms upon the globe. When Cuvier put together the bones of fossil animals found under Paris, and showed that they belonged to extinct species, different from any now living, he laid the foundation of the study of paleontology, which has since taught us that there was once a time when huge fish and amphibia were the chief animals in the world, another when reptiles had begun to flourish, while birds branched off and filled the air with feathered life; and again, that

it was only in comparatively late geological ages that the mammalia became the most powerful creatures on the earth, ending in the advent of man himself.

This discovery of the successive appearance of the different classes of animals worked a change in our ideas concerning the living creation. In the first place, it forced men to consider what they meant by an animal being "created." It was one thing to talk vaguely about what happened at the beginning of the world, and another to try and imagine how an elephant, for example, appeared abruptly in the midst of other living beings and gave rise to a new species. Men of science began to cast about for some explanation of how these numerous forms had been produced one after the other; and the great French naturalist Lamarck suggested that the different species of animals were not separate creations, but had been gradually developed from a few simple living forms, so that in the course of long ages there had sprung up a great variety of animals in the world. This suggestion did not however gain much ground with naturalists, partly because the old opinions of the fixity of species were very strong, and partly because the

cause of development on which Lamarck laid most stress—namely, the innate desire and efforts of the animals themselves to improve their condition—did not rest upon proved facts.

The study of paleontology and zoology had however established another conclusion, though it had crept in almost unnoticed. This was that animals had been destroyed by flood and famine, had fought with each other, and devoured each other throughout all past geological ages. Struggle, privation, ferocity, disease, and death had existed long before man began to be, and could therefore not be the result of any action of his. What then was the explanation of the perpetual contest causing so much suffering and destruction of life? Darwin answered this question by his discovery of the law of "Natural Selection," or the survival of the fittest in the struggle for life.

The story of how he conceived this idea and spent his life in accumulating such a mass of evidence as has convinced all practical naturalists of its truth is now well known. Since 1858, when he and Mr. Wallace together published the conclusion at which they had independently arrived, facts and generalisations confirming the law have accumulated at a marvellous rate. In

details there is still much division of opinion, but these do not concern us now. Nearly two hundred years elapsed after Newton discovered the law of gravitation before Leverrier completed the analysis of the movements of the planets round the sun according to that law. In the far more complex world of life it would be idle to expect that all could be explained in thirty years. But even in this short time the theory of the evolution of the various living forms by the action of Variation, Inheritance, and Natural Selection has taken such firm hold on men's minds that not only naturalists and those who have studied the facts, but others who are quite ignorant of the origin of their convictions, reason from evolutionary principles every day in theology, history, and other branches of knowledge, just as men reason from the theory of gravitation without being conscious of so doing.

The law of the Survival of the Fittest rests upon three undoubted facts. (1) Living creatures multiply so rapidly that there is neither room nor food for a thousandth part of them, and immense numbers die without ever coming to maturity. (2) Every living being born into the world varies slightly from every

other; no two beings were ever exactly alike in all particulars. (3) All living beings inherit more or less the peculiarities of their parents.

Now, as the first of these facts is that countless numbers of beings must perish when young, the question arises,—what is it which decides which shall live and multiply, and which shall be crowded out and die? Darwin's conclusion was that the selection of those which shall survive is made by the sharp struggle for existence between all living forms. The plant which can best withstand frost or drought, or protect itself against animals which would otherwise feed upon it; the animal which can best hide itself from its enemies, or live longest without food, or travel great distances to find it, or which can best defend itself against other animals, or overcome them and prey upon them: these will survive and transmit their superiority to their descendants while others languish and fail.

So nature selects those living beings which are best fitted for their surrounding conditions, and any being which varies, however little, in a way which gives it an advantage, or inherits such a variation from its parents, will have a better chance of surviving and passing on this

variation to its descendants. It is by this process that variations are assumed to have been strengthened and accumulated, till in the course of ages the numerous different forms of plants and animals have been produced. Such is the broad outline of the law of Natural Selection and its action in causing the evolution of living forms. Let us now see what we gain or lose in moral teaching by the discovery of this law.

It is wondrously strange that one of the most violent objections offered to Natural Selection has been that it makes pain and struggle the foundation of all the varied forms on the earth. But the pain and the struggle have existed ever since life began! The presence of suffering and evil in the world is the one mystery which oppresses all men, and against which our nature revolts so vehemently that we feel as if we could not wait till the slow unfolding of the future shall give an explanation of it. The Greek tried to solve the problem by assuming that matter had an independent existence, and that the Creator had done the best possible with a stubborn material. The Persian looked upon creation as the work of two rival powers, one good and the other evil. The Jew, having

arrived at the conception of one Deity, attributed evil to the fall of the angels and man. All three left the difficulty as great as they found it, for no solution can be satisfactory which does not go back to one Eternal Omnipotent First Cause, the origin of the whole universe, and therefore of the nature of matter, angels and man alike.

In truth, neither science, philosophy, nor theology can furnish a solution, for if we are thoroughly honest and logical, we must confess that terrible as are the suffering, the disease, the grief, the misery, and the evil passions which exist to some extent in all life, they must belong to the scheme of the universe. To attribute them to any other power than the one First Cause is to suppose that some other cause exists independently. This at once makes each of the two powers finite and conditional, and necessitates another power behind as the First Cause of both.

The only point upon which the mind can really rest is the one Universal Omnipotent Power[1] "transcending intuition and imagina-

[1] That there is one spiritual self-conscious being, of which all that is real is the activity or expression; that we are related to this spiritual being, not merely as parts of the world which is its expression, but as partakers in some inchoate measure of the self-conscious-

tion," to which we can assign no limits and no conditions, and to which we must refer every event and tendency in the known universe. Of all events therefore which seem to us either evil or good, we can only say that they form part of the will of the Universal Power, and it is our own ignorance and extremely limited experience, and not some cause independent of Omnipotence, that we must accuse of the feeling of despair caused in us by the misery around us.

Far, however, from Natural Selection having introduced pain and struggle into the plan of life, it does slightly lift the veil of this terrible mystery by affording us the first glimpse of a useful purpose served by them. If the different species were created once for all in their present form, the constant multiplication of beings only to perish while immature has no meaning. The young plants stifled by their fellows, or eaten off before their tender shoots can grow; the insects destroyed at all stages by birds and insect-eating mammals; the young birds themselves destroyed by storm or flood, or falling

ness through which it at once constitutes and distinguishes itself from the world, that this participation is the source of morality and religion; this we take to be the vital truth which Hegel had to teach.—T. H. Green, *Miscellanies*, p. 146.

victims to birds of prey, the herbivora wounded and destroyed by the carnivora; and these last perishing by flood or famine, or by disease caused by parasites feeding upon them—all this round of suffering, with its terror and agony, such as a mother-bird feels for her threatened brood, could be attributed only to the wanton prodigality of nature "red in tooth and claw."

But if Natural Selection is the law by which all the varied forms have been developed, then at least we see that these unsuccessful lives have not been in vain. They have served a useful and noble purpose, for they are the material out of which natural causes have selected those best fitted to fill the world with living beings, adapted to the full enjoyment of life so far as their structure permits. For if every nook and corner of the earth is teeming with seeds, and eggs, and young beginnings of life, only waiting for a chance to start up and grow, it follows that every living thing must strive to the utmost, and utilise any spot in which it can succeed and escape destruction from others. Some, driven from the land, have taken refuge in the seas and rivers, acquiring in the course of ages a suitable bodily structure; others conquer the air; others the depths under-

ground; while in all we can trace varied and marvellous instincts developed by the long education of necessity. And then, as the struggle goes on, instinct glides insensibly into intelligence, and among the higher animals each race, out of its own peculiar struggles, difficulties, and successes, develops the faculties of memory or attention, imagination or reason, or the emotions of affection, jealousy, suspicion, gratitude, fidelity, and veneration. Finally, in man the brain becomes the paramount controlling organ, and success in life falls to those who inherit courage, talent, perseverance, or any of the other qualities which in one way or another give them an advantage in the battle of life.

It is this purpose which the many dormant, stunted, and unsuccessful lives have fulfilled in the history of our planet, whether among plants, or animals, or the human race, if the theory of Natural Selection be true. And though this does not in the least explain why, in a scheme emanating from Omnipotence, individual suffering should be the stepping-stone to all happy and varied existence, yet when we reflect that our world is but a speck in a vast

universe, governed by unswerving law, and tending we know not whither, does not the mere fact that in our own immediate sphere we have only *now* discovered a useful purpose in that which before appeared positive evil, lead us to trust that even in individual suffering there may be a truth higher than we yet know? If one "partial evil" proves to be "universal good" in our infinitesimally brief experience, does not the onus of proof that any evil cannot have its purpose, rest with those who make the assertion?

And this brings us to the logical conclusion we must reach if evolution is to be of any service in affording us a groundwork of morality; and this is that man also is the outcome of evolution and of the working of natural laws. Nearly all naturalists are now agreed that if the different species of animals have been gradually produced by ordinary reproduction from other species man cannot be an exception. His body is formed in all its parts like those of the higher mammalia; his muscles, nerves, and blood-vessels, his internal organs and his brain, are constructed on the same model, perform the same functions, and follow the same laws as theirs. He is affected by many of the same

diseases, which he can actually take from animals and communicate to them, while their blood infuses fresh vigour into his, and even their nerves and muscles have been successfully grafted upon human beings to replace morbid portions in cases of disease. Nor is this all; animals and man have in common intelligence, memory, imagination, and even reason, as countless observations have shown, since attention has been called to the powers of the higher animals. They evince the same emotions of love and hate, fear and courage, a desire for revenge, and a power of self-sacrifice for their young, and even often for the maimed and helpless; and though these faculties are less developed in even the highest animals than in man, yet the difference is one "of degree and not of kind."

If it were not for a certain shrinking which man feels from being classed with his humbler companions, surely no one would hesitate to acknowledge the physical connection between them, and this shrinking arises from that curious incapacity we have noticed before to realise that *all* is the outcome of the First Cause. If the three great factors which we recognise in the universe—Matter, Energy, and

Life—all emanate from God, why need we concern ourselves because we cannot define the origin of each, nor discern in what sense they are but different manifestations of one and the same mystery? What can it matter to us in what particular manner our body and faculties have originated, except that we should arrive at the truth concerning them as far as our limited powers permit? No doubt it *does* concern us very much to recognise that our faculties have reached a point infinitely beyond those of the lower animals, bringing us nearer to the higher attributes of the Great Intelligence from which we spring. But if we grant the evolution of animal forms at all, we must allow that vast powers of perception and sympathy have been developed in the dog which did not exist in the jelly-fish; why then should we feel any degradation in claiming kinship with the faithful dog because we have risen so far above him?

On the contrary, this kinship affords us exactly the basis we want for studying the rules of moral conduct. We have seen how, in astronomy, we have been able to arrive at great certainty in the working of law, because the problem is simple as compared to that of life.

In the same way the laws governing living beings will be simpler, the lower the forms we study, especially if we begin with plants, in which they are apparently almost as mechanical, though on a different footing, from those of inorganic nature; then, having gained even a rough outline of the instincts developed by evolution, we shall see how these apply to the conscious actions of animals, and these again to the infinitely more responsible actions of self-conscious man. I think, in spite of much that is perplexing and incomprehensible to our limited understanding, we shall find the results very far removed from that doctrine of selfishness and cruelty, of which the theory of Natural Selection has been accused; and, moreover, we shall learn that the high moral instincts and duties which all religions inculcate have their elementary roots deep down in the sub-soil of life.

CHAPTER III

"Flower in the crannied wall,
I pluck you out of the crannies;—
I hold you here, root and all, in my hand,
Little flower—but if I could understand
What you are, root and all, and all in all,
I should know what God and man is."

TENNYSON.

So writes one of our greatest living poets, and in these lines we find the answer to the second half of the question at the head of our first chapter, "Can the herbs' virtues mine increase?" for to "know what God and man is" would be the solution of the whole matter; and even with the imperfect knowledge we now possess we shall find that the study of vegetable life does strengthen the principles which may guide us in the conduct of our own.

Not that we can attribute morality of any kind to beings so purely mechanical as plants,

that we feel at once would be absurd, and it would be equally so to try and derive the foundations of our own moral sense from them, since, immediately above the very lowest forms of living cells (which can scarcely be classed under either kingdom), the two lines of plants and animals divide, never to meet again. Plants settle down to a stationary life and employ themselves in manufacturing food out of inorganic matter; and animals, feeding on the nourishment which plants provide, take the road through active movement to sensation and consciousness.

But we are now in search of the *laws of life*, and plants are living beings. The active matter, or protoplasm, which works in a plant cell is the same as that which forms the white corpuscles of our own blood, and just *because* plants have no consciousness or moral sense, we can the better study in them the general laws common to all life. Indeed, we shall find that in many points they strangely resemble ourselves, and people who have not studied the subject will be surprised to learn how these passionless beings injure or benefit each other, showing that the bright and dark threads which we call good and evil, are woven into the very fabric of life itself.

The end and object of plant life is fully expressed in the words "increase, multiply, and replenish the earth." Every one knows how crowded a hedgerow or meadow is with plants, or a thicket with bushes and undergrowth; and if a small clot of earth be taken from under any of these it will be found full of seeds, as Mr. Darwin has shown. He relates how he took a ball of dry earth weighing six and a half ounces from the dried leg of a partridge, which had been kept for three years, and when the earth was moistened no less than eighty-two plants sprang up from this small lump.

This example serves to give us a slight conception of the myriads of seeds which are waiting everywhere, and the most passing examination in the springtime will convince us how thickly they start above ground. No sooner do warmth and moisture reach the seed than the germ begins to sprout, and struggles on till the more weakly are cut off from one cause or another, and all but one or two perish. Even among the lowest forms of life we can see that it is the *effort to live* and not the preservation of any particular life which is all-important. Hence arise the rivalry, the struggle, and the selection of those

which succeed best in overcoming the difficulties by which they are surrounded. At first it seems almost impossible that this can have given rise to all the countless varieties of plants and flowers, yet if we consider the varied conditions existing all over the earth's surface, the different climates, altitudes, and lengths of day and night, the deserts, forests, plains, mountains, and valleys, the different animals which attack plants, from mammals to insects and grubs, and the contest between plants themselves as to which shall hold the ground and live, we see how they must have assumed different forms if they were to exist and spread.

These conditions would determine the growth of the plant, the shape of its leaves and branches, and its manner of life. But there is another equally important fact, namely, its reproduction, and the formation and protection of the seeds from which new plants are to spring. Here too climate has to be reckoned with. The tender ovules and pollen must be protected from heat or cold, rain or dew, and from violent winds, and we find the shapes of the flowers adapted in various ways for this purpose. But the chief cause of variation has been the necessity for

cross-fertilisation, for all flowers require to receive pollen from time to time from others of the same species. For this service, plants, being stationary, are dependent on the wind and on insects, and it is to the methods they have adopted for attracting insects useful to their blossoms, and keeping off those that are hurtful, that we owe the lovely forms and the beautiful colours of their flowers.

Even in the lowest sea-weeds and fresh-water algæ we find cross-fertilisation from plant to plant going on in the water; while, on the land, among pines and firs and some of the higher plants such as the hazel-nut and willow, the wind carries the pollen. But the remainder of herbs, shrubs, and trees are dependent on flying insects, which visited them in the beginning no doubt to feed on the pollen, then to suck the sweet juice secreted in various parts, and at last to gather the honey which the flowers began to lay up to attract them. So through long ages insects and flowers have worked upon each other, and any one who cares can now trace for himself in the works of Darwin, Wallace, Asa Gray, Müller, Lubbock, Grant Allen, and others, the proofs of the undoubted fact that it is the insect which

has unconsciously turned the world into a "boundless flower-garden;" and that as plants owe their general form to the struggle with the climate and each other, they owe their flowers to their rivalry in attracting insects.

One of the first results of this active competition has been that thrift and perseverance are strikingly developed in plant life. Each plant must seek and use all it can find.

Annuals, with their thread-like roots, utilise the surface of the soil and hasten to grow, to flower, and to seed during the summer. They live just on the limits of respectable subsistence, storing in their seeds only enough to start the next generation. Therefore they die after a few months, and at all seasons are liable to be cut off by frost or drought, as hard times kill the poor and scantily-fed among men. Yet they flourish in great numbers because they live without the depth of soil required by more lasting plants. They can also take advantage of a brief warm season to run through their whole life, even in places where a long, cold, cheerless winter fill two-thirds of the year, for though in such climates they grow stunted and weakly, they flower and form their seeds. Again, they can

utilise the short moist periods in arid countries, and leave their seeds to sleep during the droughts. In a word, their wants are few, and they can seize opportunities not open to those which require more. A whole chapter of life might be written comparing these annuals with the lives of those among human beings who live from "hand to mouth."

Biennials take deeper root; they store up food the first year and only flower the second year when their nourishment is secured and then die. By their greater providence they can withstand seasons in which annuals perish; they provide stronger sustenance for their seeds; and their roots and leaves produce a large proportion of the food material upon which animal life subsists; but they require deeper and better soil, and may be compared to those among human beings who provide comforts and better life for their children, though passing on no store for the future.

Perennials also take one year for green growth only, then they flower sparingly even the second year and go on increasing their stock in hand, so that as herbs, shrubs, and trees they live for years and even centuries and found families; for new branch-buds start and grow each year on the old

stock, though, if struck off and planted, they become in themselves perfect plants. The world would be ill provided with vegetation without the rapidly-maturing annual, the food-producing biennial, or the store-accumulating perennial which can withstand vicissitudes to which the others succumb. Here too is a lesson for man.

Thus the effort to live, controlled by the same effort exercised by all life around, drives each plant to work perseveringly for food, to utilise every inch of available ground and opportunity, to seek the light, to provide its own defences, and to make its own friends; and any plant which fails to do this is cut off by those which are more successful.

And side by side with these food-making plants live the *fungi* (mushrooms and toad-stools) which have lost the green colouring matter and cannot make food, but take it from decaying plants or animals. These plants are often wrongly despised; their advantage is that they can live in dark dank spots; their use is that they act as scavengers, breaking down the hard tissues of rotting tree-trunks and dead vegetation and building up tender cells which soon dissolve and afford manure to young seedlings in the spring.

They are the natural result of the struggle for life driving plants along any new path open to them.

So too are the smaller fungi, the moulds and mildews, which, however, fall below the limits of respectable subsistence and give us the first glimpse of mischief workers, for they prey upon their living neighbours. As smut, bunt, mildew, potato-fungus, and others, they grow within seeds or on leaves, roots or stems, filling the grains of wheat and oats with disease in damp sunless seasons, eating away the leaves of the hop, the vine, or the mulberry. Their germs are always ready to develop whenever unhealthy conditions of climate or soil favour them, and there is scarcely a plant which does not at one time or another fall a victim to their ravages; while, in other forms, they set up diseases in insects, fish, mammals, and even in man himself.

Such parasites answer to the debased and criminal classes among men. Driven by the stress of life out of the happy useful world, they prey upon others, weakening and hindering them in their effort to live. They have their counterpart too among higher plants, just as dishonest and unscrupulous adventurers are found in good society. The Dodder, a plant which attaches

itself to thistles, oats, flax, hops, and other plants, and then decays at its root and feeds upon them, is one of these; another is the Broomrape, or Root-cancer, which feeds on the roots of the broom and gorse. Both these forms flourish in our latitudes; while in the tropics there are the Balanophores and Rafflesias, and the huge creepers in the forest, which suck the sap out of strong trees, and strangle them as they climb up to bloom in the light above.

We can view these depredators dispassionately in the plant-world, for we see that they arise simply by the natural efforts of plants to grow wherever opportunity offers; and even they may have their use, for in many cases it is the more weakly plants which become their victims, or those which from age or other conditions are nearing decay. The vigorous healthy plant, neither poorly-fed nor over-bloated with nourishment, will often resist the attacks of mildew or smut when others by its side fall victims. Thus, though positive evil-workers to the individual, these parasites may be instruments of universal good.

Be this as it may, however, there is no doubt that to themselves their life is debasing. As a fact we find that, with the exception of those which

belong originally to the very lowest forms of life, they are always stunted and degraded types of the families from which they spring. The Dodder loses its true root and thrusts mere suckers into the plant it strangles; it bears no leaves and has only a wiry stem and small flowers. The Balanophores and Rafflesias have fallen even lower, almost to the structure of fungi, except that they bear flowers. The Balanophores, living on the roots of trees, are mere fleshy lumps, each bearing a spike of blossoms, and the Rafflesia has lost even its stem, becoming nothing more than a gigantic putrid-smelling flower. Here, then, we find the absence of healthy effort leading to self-degradation even in unconscious plant-life, showing that when a being ceases to be useful and industrious, and exists entirely as a burden upon others and hurtful to them, it becomes degraded itself, and is at war with the whole better balanced world. Thus the dark thread of evil appears as the converse of the healthy struggle out of which higher forms arise.

For when we turn from these baneful forms to vigorous vegetation we find that the interaction of plants with each other, and with animals, is so intimate that there are none which, in fulfilling

their own life, do not do something for the good of others. Let us consider the case of self-defence. A plant grows thorns or bristles, or secretes a bitter poison to save its leaves from being devoured, but in so doing it secures its own growth, and not only purifies the air but bears flowers in which insects find pollen and honey. More than this, the very same organs of a plant often serve both for defence against foes and for guidance to friends. The bristles and hairs on a flower-stalk, or even in the flower itself, which prevent wingless insects from creeping in and stealing honey without carrying pollen to other flowers, also serve as *path-finders*, guiding flying insects along the right road to the hidden nectary, so that they necessarily rub themselves against the anthers or the stigma on their way. Numerous cases of these path-finders occur among the Labiatæ (dead-nettles and their allies), the Centaureæ (corn-cockles), and in the Scrophularinæ, (fox-gloves, and mulleins).

Another device for attracting as well as repelling is found in the strong oils secreted in the petals of flowers which serve both as distasteful flavours to keep off grazing animals and as scents to attract bees or moths; while an example of

mutual benefit occurs when low-growing trees and bushes, especially if they are prickly or distasteful in any way to grazing animals, form a protection for annuals and small plants which grow under them, at the same time that they shade them from the scorching heat of the sun. These small plants, on the other hand, help to keep the ground moist around the tree-roots, and their leaves decaying every year form manure which is washed down into the soil.

Endless examples such as these of protection and assistance, both between different species of plants and between plants and insects, will occur to the reader when once his mind is directed to them. But these will serve to show that although the laws of life are undoubtedly stern, and each individual must strive for its existence, yet mutual help is a great factor of success even among plants. We actually find them using persuasion toward their pillagers, as in the case of the bush-vetch (*Vicia sepium*), the wild cherry (*Prunus avium*), and numberless others which have nectaries in their leaves to tempt ants and other creeping insects to seek honey there, so diverting them from the flowers which they would injure. Again they offer many tempting invitations to their friends

in the shape of fruits, as when, for example, the plum or the cherry provide a luscious feast for birds, in order that they may carry the stone away and drop it in a new place to grow. Another remarkable example is the nutmeg, of which the fruit bursts open on the tree, exposing the bright red-coloured mace surrounding the seed. This mace is a bait for pigeons, which delight in it and swallow with it the nutmeg, which passes undigested through them, and finds a fresh home in which to germinate.

A still more striking instance of hospitality, this time with a view to protection, was observed in Nicaragua by Mr. Belt, where small stinging honey-eating ants live on a plant called the bull's-horn thorn. This plant bears thorns which are soft and full of a sweet pulpy substance when young, and upon this the ants feed, while they bore a hole in the coating of the thorn for entrance and exit. By and by the thorn, now hollow, hardens, and in it they live and rear their young, sipping the honey which is secreted at the base of each pair of leaflets, and feeding upon a little yellow fruit-like body growing on the leaves. These yellow fruits ripen one after the other, and so the ants are kept running over the young and

tender leaves. Now, why should this plant feed and shelter a whole army of ants? Simply because it has very dangerous enemies in the leaf-cutting ants and grazing animals which destroy its foliage, and by affording shelter and food to these sharp stinging ants which throng out in numbers directly a branch is shaken, the shrub is protected from attacks. This one case, which has been established, may afford a clue to many others where ants and insects of various kinds inhabit parts of plants without doing them an injury; for investigations into these questions are still quite in their infancy.

Meanwhile, do not such examples as these show that life is not a mere selfish warfare, but that mutual help and service are among the very laws of existence, and that the truly fittest to survive are those who, in working for self-preservation, promote also the good of others? This is still more clearly seen in the mutual adaptation of plants and insects; for flies, butterflies, moths, beetles, and bees all visit and help to fertilise flowers, and in each case there is some special adaptation of the insect to the flower, and the flower to the insect which visits it. The size of the fly, the length of the proboscis, the weight of

the insect, the manner in which it enters the flower, the rapidity with which it flies from one plant to another, are all-important; as are also the position of the honey in the blossom, the time when the stamens ripen, the hour of the day in which the flower opens, or at which it gives out its scent, besides all the marvellous contrivances for conveying the pollen to the proper part of the insect, so that it may reach the stigma of the next flower it visits.

The butterfly can reach to the bottom of a tube inaccessible to the bee, the humble-bee can weigh down petals and obtain honey or pollen which the little honey-bee is too light to uncover. Moreover, we find that bees visit many more flowers, and also flowers of more complicated structure than other insects. Why? Because the gathering of honey has become the work of the bee's life, therefore it is the insect most useful to the flowers. So plant and bee have developed together, those plants surviving whose flowers by degrees hid their pollen or their honey most skilfully from vagrant insects, yet leaving always some clue by colour or marking to guide the bee; and the bee little by little quickening in intelligence, because those which found their

way best to the most useful flowers would both flourish themselves and propagate the plants which yielded them their food.

Even here we, however, have examples of the balance wavering between usefulness and mischief-working. Many humble-bees and beetles try to gnaw their way through flowers to the honey, when they cannot enter from above; and small creeping insects, as we have seen, find their way through cracks and crevices. Then at once antagonism and defence are provoked, and those plants survive best which can circumvent marauders.

Some flowers like the Campions (*Silena inflata*) have the calyx inflated so that the proboscis of the bee cannot reach the honey after it has gnawed a hole; others, among which the Proliferous Pink (*Dianthus prolifer*) is a striking example, have their calyx and bracts stiff and hard, so that they cannot be bitten. In others, again, sticky glands, and hairs on the flower stalk, are common protections against creeping insects; as in the sticky Lychnis (*Lychnis viscaria*), from one flower stalk of which Professor Kerner collected sixty-four small insects,[1]

[1] *Flowers and their Unbidden Guests*, p. 53.

and in the Clammy Groundsel (*Senecio viscosus*), which has a dense covering of exuding hairs, through which creeping insects cannot pass without becoming imbedded in the slime.

Thus, we see aggression at once met by antagonism; while attempts to appropriate the savings of others (namely, the stored honey), without rendering service in return, are defeated even in mechanical plant-life by all kinds of devices, the very attack actually bringing about the defence, by destroying the chance of the fertilisation and production of young of such individuals as are least protected.

Lastly, in some cases, the effects of taking food without giving an equivalent recoil on the insects themselves, and we have a curious illustration of defence becoming aggression. We have seen how, on the viscid lychnis, dying insects were found, held there by the gummy secretion which keeps them away from the flower; and the spurges protect themselves in a similar manner by a thick white fluid which oozes out of the stalk when it is pierced by an ant's claws, thus making him a prisoner. Other plants, such as the Bromelias, keep creeping insects at bay by a stiff rosette of leaves near the

ground, forming a cup which holds rain and dew, in which the intruders are drowned.

So far the plants only protect themselves. But the Mountain Butterwort (*Pinguicula alpina*), the Sundews (*Drosera*), and Venus's Fly-Trap (*Dionæa muscipula*), have glands on their leaves which not only hold the insects, but digest the juices of their body for food. Again, the leaves of the Side-Saddle Flowers (*Sarracenia*) of America, and the Pitcher-Plants (*Nepenthes*) of the Indian archipelago have been converted into buckets, or pitchers, holding water, in which the victims are drowned and their juices digested by glands lining the pitcher.

Here we have the tables turned with a vengeance, plants feeding on animals instead of animals on plants, and as this is our first example of animals killed for food, let us pause to consider what it implies. Some would call it cruelty and liken it to the creation of disease by parasites. But be not too hasty. To be crippled and disabled in the work of life, we all allow to be an evil; since an unhealthy being, whether plant or animal, is at a disadvantage in the struggle for life. But death, which ends this

struggle, cannot be regarded as cruel, for the *healthy development* and not the *duration* of any one life is the important point. "Death," said Socrates, "cannot be an evil, since it happens to all men." He might have said, to all living beings, and since the very existence of such an immense variety of creatures depends upon their feeding one upon the other, this universal law of life cannot be a wrong, nor even an evil, except so far as suffering accompanies it.

There remains still another feature of plant-life which, fanciful though it may appear, is yet worthy of notice. This is the sacrifice to some extent of certain individual blossoms for the good of the whole group of blossoms, and therefore of the plant.

We all know that some small flowers, such as the Hemlock and the Elder-Blossom, are grouped thickly together in one inflorescence, so as to produce a mass of white or other colour; while in the Thistle, Dandelion, and Scabious this is carried farther—a number of florets, each a perfect blossom forming its own seed, being crowded into one dense flower-head. The object of this is clearly to make the flower conspicuous and attract insect visits, so that pollen may be

brought to many florets, and a large number of seeds formed.

Now a flower-head becomes much more conspicuous when the small tubular flowers are surrounded by a crown of large petals, whether white or bright coloured, as in the daisy or dandelion. This advantage has led some plants, such as the Viburnum or Guelder-Rose, the Knapweeds, the Sunflowers, the Bur-marigold, and others, to give up forming seed in the outer florets, and to use the material in growing large petals striking to the eye. Thus these florets are deprived of their natural function in order to increase the fertility of the inner ones, and in so doing strengthen the whole community.

As we have said before, it would be manifestly absurd to call this self-sacrifice when speaking of the mere adaptation of the flowers of a plant to its welfare. Yet it does show that the laws of nature recognise every variation which tends to the better success of the individual or the community, by Natural Selection rigidly weeding out those which are less successful; and though this seems a very unimportant modification in plants, yet when we come to consider insects, we shall find that purely structural

changes of the same nature (see p. 65) do lead through natural selection to the development of such a noble trait as self-devotion.

And here we must end our very brief sketch of plant-life, content for the present with having suggested a few pregnant thoughts, and learned one great lesson—namely, that among plants injury to others calls forth opposition, and recoils upon the injurer; while, on the other hand, those succeed best who, in fulfilling their own life, also compass the good of other beings. Thus, through struggle and mutual help, has come to pass the development of highly organised, beautiful, and wonderful forms even in the plant world. And we must remember that this has not taken place by special guidance along certain beneficent lines, since degradation and partial deformities result as by-products of the struggle for life; but that the overwhelming preponderance of healthy, happy, and varied existence has been brought about by the steady working of natural laws among which the struggle to survive and the constant action of natural selection are the most important. Can we question that here we have a foundation never to be shaken by any change of opinion or dogma?

CHAPTER IV

"How wonderful! that even
The passions, prejudices, interests
That sway the meanest being, the weak touch
That moves the finest nerve
And in one human brain
Causes the faintest thought, becomes a link
In the great chain of nature."—SHELLEY.

FORTIFIED now by two general conclusions,—that life works by definite laws, and that, in the struggle for existence, self-preservation and mutual help work hand in hand,—let us turn to animal life, in which the problem is much more complex. For, in the first place, the mere fact that even the lowest animal forms move in search of food, makes us assume *purpose* in their instincts where we have only recognised mechanical action in plants; and secondly, as the great naturalist Huber remarked, "a little dose of judgment or reason comes into play even in animals low in the scale of nature."

We can no more decide at what point this new element is developed, in the ascending scale of life, than we can tell when a child begins to think. But we cannot doubt that such creatures as an octopus washing and tending its young, or an earwig gathering them around her as a hen does her chickens, do understand in some way what they are doing; and when we come to such insects as spiders, bees, and ants, we observe that they hesitate, choose, and decide what they will do, and even recognise when they have made mistakes.

And together with this dawning of judgment and reason comes emotion, and these little creatures exhibit anger, jealousy, curiosity, playfulness, caution, and fidelity. No one can doubt that an ant has at least an instinctive perception of its duty, so to speak, to the community; that workers show courage when they fight to the death for the cocoons under their care; or that the robber-bees creep stealthily into the strange hives, quite aware that they will be killed if detected. Yet blind instinct still holds these insects with a firm grasp, and they perform their duties far more mechanically and unerringly than even the lowest of

the vertebrate animals; therefore, we shall do well to glance at them before we pass on to what more immediately concerns us.

As in plants, so in insects, to feed and multiply is the main object of existence, and the peculiarities of their structure can all be traced directly or indirectly to these necessities, though very much complicated by the number of different stages in their lives as larva, chrysalis, and perfect insect. In the first stage, feeding is their whole life; in the second, those which become quite still must find protection during their sleep; and in the third, feeding and egg-laying, going hand in hand, have led to the greater part of the marvellous adaptations and defences of plants and perfect insects.

The feeding stage need not occupy us long, except to glance once more at the curious fact of parasites. Insects multiply at an almost incredible rate, and though no doubt in early geological times, when the cricket and the centipede fed in the forests out of which our present coal was formed, plants were their only food, yet soon the pressure of life drove some, such as dragon-flies, to feed upon others; others, such as beetles and wasps, to devour decomposing matter,

acting as scavengers; while out of almost every family of insect life some are parasites during the first part of their existence.

And here we find the same lesson as in plants. Any grub or caterpillar, which comes from an egg placed by the mother inside some other creature, is soft and of low structure, with no limbs, having no need for them. Yet when it emerges from the chrysalis state into that of an active being, which must seek its own food and a place to lay its eggs, the full-grown insect has wings, antennæ, and other parts delicate and beautiful. In some cases, however, as in the stylops (a parasite living on the humble-bees), the mother does not cease to be a parasite, but lives on, a blind, legless creature, giving birth to her young ones without ever becoming perfect herself.

All this is in accordance with the survival of the fittest in the struggle for life, for when driven to a torpid existence, sapping the life of others, it is a saving to the parasite not to develop parts it will never use, or to put them on only when bursting into active life. Yet at the same time it emphasises the irrevocable law that *effort raises*, and *dependence lowers*, warn-

ing us, as rational beings, of the danger of drifting into helplessness and dependence ourselves, or of driving others into it either by our own greed or injustice, or by the indolence which induces many to bestow indiscriminate charity rather than take the trouble to help others to help themselves.

But this is anticipating. Returning to the insects, we find that, on the one hand, they have endless offensive devices for protection and attack; as, for example, the nauseous taste of some caterpillars and beetles, protecting them from birds, or the bristles of the hairy caterpillar, which serve the same purpose, and also prevent the ichneumon-fly from laying its eggs under their skin; their constant movement making it difficult for her to insert the long sheath or ovipositor, through which she passes her eggs, into the bodies of her living victims. In like manner the horny covering of the weevils, the powerful nippers of many beetles, as, for example, the stag-beetles, the stings of bees, wasps, and of some ants, the strong fluid that the bombardier-beetle squirts back at its pursuer, are all modes of defence.

Yet, on the other hand, even among the lower insects mutual help is found. The dung-

beetles (*Scarabæidæ*) will assist each other in rolling up the pellets of dung which they bury with themselves for food. Many caterpillars weave tents in common; thus the caterpillars of one of the fritillaries (*Melitæa Cinxia*) join together and form a pyramidal silk tent, which shelters them from sun, rain, and attacks of birds. When they have exhausted the food near this tent, they move on and weave another; and in the winter they make their shelter rounder and stronger, and lie heaped up upon each other, sometimes as many as a hundred together, till spring comes, when they separate, each to form its own chrysalis.[1] The processionary caterpillar does the same, and these insects travel over the trunks of trees in long lines, a shock given to the first, passing all along the line as if giving warning. Lastly, in ants there can be no doubt that warning is given from one to another, and when any member is in danger the others are uneasy. M. Huber relates how, when he disturbed some ants which were drinking, one who had started away turned back and pushed and struck three others till he drove them home; a fourth was restive, but in spite

[1] Kirby and Spence, *Entomology*, p. 301.

of his menacing jaws the other dragged him away by the hind-leg till he was in safety.

A study of the adaptations for self-preservation among the numberless forms of insects, will repay any student, who will watch nature carefully for proofs that survival of the fittest forms has developed in each type its beauty, its peculiarities, and its powers, creating all the wealth of the insect world; while, at the same time, he will come across many unexpected instances of mutual help and protection.

The most important adaptations, however, as bearing on our present subject, are connected with the second great instinct of reproduction; for this, which in plants has given rise indirectly to the beauty of their flowers, lies in animals at the root of the far more important qualities of love and sympathy.

In feeding, a creature supplies its own wants; in multiplying and providing for its young, it labours for those "other-selves," to whom it will often sacrifice its life. It is in insects especially that we can best trace how a mother's care was at first a mere mechanical instinct, only a step above the protection of the seed in plants. For among all the lower insects the

mother *does not live to see the eggs hatched.* Yet she will take great trouble and risk to lay them in safety, on plants quite different from those on which she herself is feeding, though it is true that during her early caterpillar life she was nourished upon them. Thus the common cabbage butterfly sips the blossoms of the flower-garden but goes among the cabbages to lay her eggs. The cockchafer, which, when flying, feeds on the leaves of trees, buries herself in the earth to lay, so that the grubs when hatched eat the tender grass roots. The dragon-fly lives on insects in the air, yet drops down on the leaf of a water-plant to deposit her ova, which yield grubs whose life for more than two years is spent at the bottom of the stream.

More wonderful than all these, the honey-sipping *sphex*, or sand-wasp, burrows a tunnel in a bank, lays her egg in a hollow at the end of it, paralyses grasshoppers by stinging them at those points in their body where the nerve-cords meet, lays them alive yet motionless by the side of the egg and then closes the opening.[1] In this way she provides separate tunnels and food for several eggs, so that the grubs, which she never

[1] Fabre, *Souvenirs Entomologiques.*

sees, find fresh food ready for them when they awake. All this is done so mechanically that a sphex, whose cell was emptied both of egg and food, after going in as usual and looking round, went on where she had left off and closed the cell *with nothing in it.* Yet so determined and earnest are they in their work that no danger or difficulty hinders them.

From an instinct so strong as this, it is quite natural that there should spring a tendency to watch over the young when the mother lives to see them; especially as, on the theory of natural selection, the best mothers would rear the most offspring, and thus the tendency would increase. And, in fact, even among lower insects we find the cockroach helping her young out of the egg-sack, and the earwig hatching her eggs and gathering the young around her, as a hen gathers her chickens; while the hunting spiders carry their egg-bags under their body, and will fight for them till death. One of these spiders (*Lycosa saccata*) not only opens the bag for her young to escape when hatched, but carries them upon her body and feeds them till they cast their first coat.[1] Then we have those solitary bees and

[1] Kirby and Spence, p. 205.

wasps which form a home and store food for their family; and lastly, the bee, wasp, and ant communities, where numbers are banded together for helpfulness and security.

And here occurs a remarkable feature peculiar to insects, yet teaching how, in the struggle for existence, self-devotion and self-sacrifice for the good of all have been developed out of the maternal instinct. For in the homes of bees and ants the workers are neuters or imperfect females, which never become mothers, and yet tend and watch over the eggs and cocoons of the young as if they were their own. They nurse them, clean them, play with them, and in the case of ants, lead them about the nest and educate them, and will risk their lives to protect them. Such naturalists as Huber, M^{c}Cook, Forel, and others who have studied the lives of ants, can scarcely find terms strong enough to express their admiration for their industry, intelligence, and self-denying care of the nest; especially in the case of the slave ants, carried away from their own nests in the cocoon, yet when full-grown, feeding, nursing, cleaning, and working for the species of ant which has taken them captive.

But what concerns us chiefly here, is that

these communities teach us how, even among insects, co-operation, and some self-abnegation on the part of the individual have been developed for the good of all. We saw the beginnings of this even in the mechanical life of plants (p. 53), where the reproduction of some florets in the composite flowers was sacrificed to the general attraction of the flower for insects; and now we find the same sterility induced in insects for the welfare of the whole community, while yet the working bees and ants show as great an attachment and devotion to the young as if they themselves were the mothers.

In the overwhelming pressure of insect-life it is evident that the solitary bee, such as the anthophora or the osmia, which has to lay the eggs, build the comb, store the honey, and nurse the young is, other conditions being equal, at a great disadvantage compared with a community in which the queen bee only provides the eggs, and the workers, stopped in their growth at the neuter stage, use the maternal instinct entirely for the good of the hive. And so true are these instincts of industry and devotion to the community that neither in the bee-hive nor the ant's nest is there, so far as we can detect, any leader

or master to constrain each to do her duty. The long inherited habits induced by the survival of those mother bees or ants which gave birth to steady working communities, seem to be sufficient to keep all in order, though, as we saw when one ant wished to take the other out of danger (p. 61), it is possible for an ant to have "a will of her own."

Lest, however, we should rank these insects higher than they really are, we must note here a strange fact which has also its significance. Among nearly all the forms of lower life till we come to vertebrates, the *father* does nothing for the young; his use is purely to fertilise the egg-laying mother. When this is accomplished, the males and many of the females among ants die in the open air, destroyed by rain or devoured by birds, and the females which survive pull off their wings and return to the old nest or found a new one. Among wasps the males are more useful, for they act as scavengers, sweeping and clearing the passages of the nest; but as wasps lay up no food for the winter, the males and workers all die off as the cold season comes, leaving only a few queen-wasps to start fresh communities in the spring.

Among bees, however, an apparently cruel scene takes place, for as winter draws near the workers turn the males or drones out of the hive and sting them to death. The reason for this is clear. In winter food will be scarce, no idle mouths can be fed, and the drones never work, and are many in number. They have become, in fact, though from no fault of their own, a burden on the community, and as such are destroyed. Probably the speedy death is more merciful than the slow starvation among wasps, yet this wholesale destruction of fellow-citizens reminds us that individual sympathy belongs chiefly to creatures higher in the scale of life. In insects the instinct of self-preservation reaches its utmost development in the preservation of the community, and personal affection for special individuals is rare.

On the other hand we can observe among insects the evil side of self-interest in the form of selfishness and self-indulgence appearing side by side with self-devotion. From time to time among bees robberies are committed on other hives, sometimes by solitary bees, sometimes by an army, which enters a neighbour's community to steal the honey; and when this happens on

a large scale, the robber bees become regular marauders, collect no honey of their own, and often destroy a whole bee-stand. Ants, too, have their wars, sometimes for a disputed plot of ground, sometimes for the possession of the aphides or plant-lice, which yield the sweet liquid the ants love so much, and to obtain which they will even tend the aphides and keep them underground on the roots of plants as a milkman keeps cows in his sheds. Among certain species of ants sanguinary wars also occur for the purpose of making slaves; and here, again, we meet with the lesson of degradation following upon self-indulgence, for while the individuals of one species of slave-making ants have not yet lost all sense of industry, but work with their captives, those of another species (*Polyergus rufescens*) have become quite helpless and die from want of food when their slaves are taken from them. They only retain one useful weapon—their pointed mandibles, with which they fight when they attack a nest to steal the slave cocoons.

With the ants we reach the highest development of insects; and now when we turn back and start along another line—that of vertebrates

—we find greater possibilities and promise of higher qualities from the very outset. For here intelligence, individual experience, and reason begin gradually to supersede fixed instinct; and, as each individual life becomes its own centre, creatures live in pairs or family groups, and the father now, for the first time, takes the position of protector and provider.

Even among fish the stickleback builds a nest in the water and coaxes or drives the mother into it to lay her eggs, which he defends till the young fish are strong enough to swim about and feed themselves; and among pipe-fishes it is the father who carries the eggs in a pouch till they are hatched. The young of the great pipe-fish, which lives in our bays and harbours, even take refuge when alarmed in the father's pouch after they have begun to swim about. Among amphibians the obstetric frog (*Alytes obstetricans*) takes the eggs from the mother, and twisting them in strings round his hind-legs, carries them in the water till the tadpoles emerge. Among reptiles, however, we have no instances of paternal care, though the mother, both among crocodiles and snakes, often watches over and protects her young.

But when we rise above these cold-blooded animals to birds, the attention of the male bird to his mate or mates, and his care of the young, is often as true and steadfast as among the best of human beings. Not only do both birds, male and female, work together in preparing the nest, but in some birds, as, for instance, the puffin, the father digs the tortuous burrow about ten feet deep in the earth ready for the eggs. Among nightingales and other birds the father feeds the mother regularly while she is sitting, while in some cases, such as the dotterel and the ostrich, he often takes her place on the nest. All books on birds are full of touching anecdotes of the affection of parents for their nestlings and for each other, and any one who has ventured too near a brood of turkeys or geese will have learnt by experience that male turkeys and ganders can protect their young.

Moreover, as individual experience and education now begin to take partly the place of instinct, the father and mother together guide and teach their young. While a butterfly takes to the wing at once on leaving the chrysalis, and sips honey from the flowers without any need of example, the young birds have

to be taught to fly, to find their food, and to recognise different dangers; and when we remember how many thousands die in the early spring, we can understand how those will best survive and flourish whose parents develop the greatest amount of intelligence and affectionate care and devotion.

Therefore, we are not surprised to find that birds become social and form communities, either for seeking their food and migrating, as among field-fares, starlings, swallows, and others, or for life, as among the rooks. It is among these last that duty to the community is probably carried to its highest point among birds. Thus rooks are known to place a sentinel to watch for danger while the rest feed, and if he fail in his duty he is judged and pecked to death. Young birds also, which begin by stealing twigs from others to build their nest, are soon taught a better morality, for several of the older birds unite to tear their nest to pieces till they do their own work honestly. On the other hand, rooks have been known to feed a blind or a wounded companion, and even to make attempts to release one caught in a snare.

One of the most touching instances, however,

of devotion to a comrade is given by that very reliable self-taught naturalist, Thomas Edward, as occurring among the terns or sea-swallows, which live together in colonies, laying their eggs on the sea-shore, on marshes, or sandy shingle. Having wounded one of these birds on the coast of Banffshire, he relates: "I beheld, to my utter astonishment and surprise, two unwounded terns take hold of their disabled comrade, one at each wing, lift him out of the water, and bear him out seawards. They were followed by two other birds. After being carried about six or seven yards, he was let gently down again, when he was taken up in a similar manner by the two who had been hitherto inactive. In this way they continued to carry him alternately until they conveyed him to a rock at a considerable distance, upon which they landed him in safety.

"Having recovered my self-possession I made toward the rock, wishing to obtain the prize which had been so unceremoniously snatched from my grasp. I was observed, however, by the terns, and instead of four, I had, in a short time, a whole swarm round me. On my near approach to the rock, I once

more beheld two of them take hold of the wounded bird, as they had done already, and bear him out to sea in triumph, far beyond my reach. This, had I been so inclined, I could no doubt have prevented, but I willingly allowed them to perform, without molestation, an act of mercy, and to exhibit an instance of affection which man himself need not be ashamed to imitate."[1]

Thus we see how, with quickened intelligence and social habits, affection and sympathy enter the life of birds, probably much more fully even than we can trace. Yet in them, as in mankind, we can also trace in many instances the instinct of self-preservation conflicting with that of self-devotion; as, for example, when migratory birds have a late brood not yet fledged when the time arrives for starting on the autumn journey. In this case there are examples on the one hand of a mother leaving her young behind, and on the other of her staying to face the winter with them.

When from birds we pass on to mammalia, whose young are born alive and still more helpless, the necessity for care and attention to the

[1] Smiles, *Life of Edward*, p. 240.

mother while she is suckling and tending her little ones calls out more and more the instinct of the father to provide food and defend his family. So we find the males strong and powerful in the lion, bearing antlers in the stag, tusks in the boar, horns in the antelope and buffalo, while father and mother alike develop cunning and the necessary qualities for finding food and providing for themselves and their young. With courage, too, comes tenderness and affection for those protected, and with increased danger, increased intelligence and devices to meet it.

Thus when we reach the higher animals, such as the elephant, the dog, and the monkey, we find that the battle of life through long ages has developed in them, memory, imagination, and no small amount of reason and judgment; and together with these the emotions of love and hate, courage and timidity, emulation and gratitude, suspicion and curiosity, and at any rate in dogs and elephants, the rudiments of what we call conscience, shown by a sense of shame when they have done a thing for which they have once been punished.

Instances of intelligence and affection among the higher animals are so well known that it is

scarcely necessary to quote them. Every one knows how the lion remains with his family till the cubs are grown, protecting the mother and teaching the young to hunt, and also that most animals among the carnivora are excellent parents, though only wolves, wild dogs, and jackals, become social, and hunt in packs. Among the herbivora, on the other hand, where the animals have to defend themselves against the attacks of wild beasts, social life, and services rendered from one animal to another, are rather the rule than the exception. Rabbits, though timid and rather stupid animals, stamp with their hind feet to warn their comrades of danger; even sheep do the same with their forefeet, and an old ram will defend a flock from a dog. Beavers build their homes in common, each family living in a lodge with others close around it. Prairie-dogs, rats, and other rodents live and work together, and seals travel in large shoals and set sentinels to watch for danger when they camp on islands for the breeding season.

Among seals, however, family-life is more important than devotion to the community, and they are perhaps a striking instance how, among the higher vertebrate animals, the home-

centre became the chief starting-point, family affection having been much more strongly developed than in insects or other lower orders. This may perhaps explain why in the human race the social mechanism has not even yet reached the perfection which we find in ant-communities. For in man deeper and more complex motives come into play, and the home-life has, as it were, to be reckoned with and widened, before such devotion to the community can arise, as is found among the less sympathetic insects.

The courage with which the fur seal holds his position as the head and guardian of a family is said by the best authority, Mr. J. A. Allen, to be of the very highest order; he will defend his wives to the death, and also the pups so long as they remain on the spot he has chosen for the home. But if they stray beyond this boundary, neither he nor the mother seek them out, and it is the bachelor seals, those who have failed to obtain wives, who watch over the young pups and become their "jealous and fearless protectors" in the autumn when the fathers swim away.[1] Does not this last fact show incidentally how the emotion of affection once awakened craves to find satisfac-

[1] Allen, *North American Pinnipeds*, p. 356.

tion in animals as in man? Do not the fatherless seals, tending the deserted young ones, remind us already of many unsatisfied human lives which find their satisfaction in fulfilling the loving duties neglected by the more successful?

And, indeed, among the more intelligent animals we do find self-devotion in some of its most touching forms. The buffaloes putting the females and young in the centre of the herd and defending them against attack; the male baboon, which came down from the mountain in the face of the dogs to rescue a foolish young baboon scarcely six months old which had remained behind; the elephants, who placed a badly wounded tusker in their midst, and supporting him between their shoulders, succeeded in securing his retreat to the forest; nay, even the elephant whose master rode him carelessly through dead and dying natives in an epidemic, and who yet carefully picked his steps among the people so as not to injure them,—such instances as these are well worth recording, for it is a great error to suppose that man is lowered by proofs that dumb animals also show signs of nobleness of character.

On the contrary, bearing ever in our minds that the laws of nature are the working out of the

will and intention of the Great First Cause of all, we find a surer foundation for our own higher instincts when we see the manifold branches of life spreading ever upward from their unconscious root and opening out to greater and greater possibilities. And surely, as we watch one by one the nobler qualities developing, by the daily experiences and efforts of beings in the ascending scale of life during long ages, our hearts must thrill with an emotion akin to that felt by the patriarch Jacob, when awaking from his dream he exclaimed, "Surely the Lord is in this place, and I knew it not!"

For we stand above even the most noble of these lower animals in our power of reflecting on the past, and thus foreseeing what may happen in the future; and still more in being able to examine our own impulses and actions and to compare them with laws governing the outer world. It is this wonderful faculty, and not the mere power of choice or free-will upon which many lay so much stress, which raises us so far above the dog or the baboon. These can and do choose between different actions, and suffer when they make mistakes; but they lack, so far as we can see, that *self*-consciousness and mental power

which enables us to look beyond the visible and material phenomena to the invisible laws which govern them.

And this it is which lays upon us so heavy a responsibility; that we can reflect upon our own being, upon the consequences of our actions, upon the problems of life, death, and eternity. Surely then, having this faculty, it behoves us to inquire very seriously how far our actions are in accordance with those laws which have been in force ever since the world began; and when we find that we are tending toward that degradation which we have seen to be the converse of the upward struggle, to mend our ways and strive that ours may be the healthy, vigorous rivalry which works good both to the individual and to all. How far our present study of the laws of life can guide us in this we must next consider.

CHAPTER V

"A wise man will extend this lesson to all parts of life, and know that it is the part of prudence to face every claimant and pay every just demand on your time, your talents, or your heart. Always pay; for first or last you must pay your entire debt. Persons and events may stand for a time between you and justice, but it is only a postponement. You must pay at last your own debt."—EMERSON.

WE have now traced in a very general and imperfect manner the working of the laws of life in plants and animals. The outline is necessarily very rude, both because it has been given so briefly, and also from the imperfection of our knowledge. Still we have established some general truths which we now can apply to the conduct of our own life.

The first of these, upon which all the rest depend, is the invariability and steady unswerving action of the Will of the Author of all things, as expressed in the laws of the universe. This world is not one in which, by chance or by

solicitation, we can escape the consequences of our acts, or reap that which neither we nor our ancestors have sown. In inorganic nature we know that a flash of lightning travels according to definite electrical and atmospheric laws, whether it strikes the bare ground or a human being. The earthquake occurs in accordance with the conditions of the globe at a certain time and place, whether it disturbs a desolate plain, or destroys a populous city. In mechanical plant-life the weakly seedling, or one falling on barren rock, is destroyed by wind or weather, or stifled by other plants, unless it possesses some faculty of adapting itself and obtaining nourishment and support. In the animal world the creature which, from want of intelligence, from inheriting a weakly nature, or from some other defect, fails to find food and protect itself, will invariably be cut off in the struggle for life. And in man, hard though it may appear at first sight, the child who, through faults of its ancestors, inherits disease of body or mind, who, through bad training and surroundings, develops vicious tendencies, or through ignorance or want of judgment, loses his way in life, must pay the full penalty of weakness and mistakes. His only chance of

escape is when, by the help of others or the effort of some faculty in himself, he can adapt himself to the conditions of life, as the trailing plant lifts itself to the light up some friendly wall, or the little black ant, taken captive by a stronger race, conquers it by industry, and becomes the true master of the nest in which it was a slave.

And this brings us to the point so often made an excuse for self-indulgence. If we are thus held so firmly in the grip of inheritance and training, how can we be responsible for our actions and our upward or downward course? The answer which science gives leaves us no loophole of excuse, nor does it oblige us to enter into the vexed question of free-will, which is as hopeless as the origin of life itself.

From the very beginning of animal life, we see a power of "choice" developing together with consciousness; till, in insects, we see ants even consult together and determine upon a line of action, while in the vertebrata, to which we ourselves belong, the governing power of adjustment in intelligent acts becomes still more marked. Any one who has studied animals must have observed that a dog will hesitate

whether to follow his master, or stop to eat some tempting morsel; and the touching example given by Mr. Lloyd Morgan[1] of his favourite terrier, who turned to bite as his master sewed up a painful wound, but checked himself before the teeth closed tightly, and piteously licked the hand instead, shows how self-restraint may be exercised by animals. No doubt they will decide according to their nature and training, but decide they *must*, and they show that they exercise the power of choice. In the same way a drunkard who once excused himself to me, that he must drink, for he had inherited the tendency, could nevertheless not deny that the "choice" lay with him to take or refuse the glass; for, as I pointed out, the very fact that he could *recognise the tendency*, showed he had a faculty within to resist it—which he did, and became a sober man.

No doubt a keen discerner of character might predict which way this man would act according as he had a weak or strong will, and according to the force of the circumstances surrounding him. But the man himself cannot do so impartially, because in the very act of predicting he would be implicitly making a choice—namely, that of

[1] *Animal Life and Intelligence*, p. 340.

continuing, or relinquishing as hopeless, the effort to resist; and it is *effort* of all kinds which we see to have been of such paramount importance in the history of the evolution of living beings.

From the earliest beginnings of animal life upwards we see gradually dawning this power of choice, out of which responsibility springs. The higher the creature, the more personal experience and choice take the place of fixed mechanical instinct, till in ourselves the power of reflecting upon the consequences of our actions, and *remembering* how we have succeeded or failed according to our decision, brings a sense of right or wrong action, where, in mechanical instincts, we see only fitness or unfitness to succeed. Thus, as in obeying the laws of chemistry or of physics, man subdues them to his purpose, so in obeying the laws of life he succeeds in the struggle for existence, and the power by which he does so, like *all power* in the universe, emanates from God.

But now we find ourselves in the midst of a new order of things. Through long ages this power of intellect and moral purpose, strengthened and developed in the struggle of man with man, and man with nature, has drawn us, on the

one hand, nearer and nearer to the Great Power, from whom we derive this higher life; while, on the other, it has become a fearful possibility for evil. The plant which saps the life of another performs a merely mechanical act; the ant which makes slaves follows a fixed instinct which it has inherited, and has no consciousness of degradation. The bird, whose instinct of self-preservation urges her to migrate and neglect her young, forgets them as soon as they are out of sight, and feels no remorse. The animal which gratifies the strong instinct developed through all nature for the purpose of reproduction, never thinks of the instinct again till the next occasion occurs. But man, remembering in all these cases the pleasure or the pain, the fitness or unfitness of his action, and deliberately resolving to repeat or to avoid the pleasurable sensation which is unfitting—to persevere in, or to neglect, the effort which is fitting—*works out his own development or degradation, and knows that he is doing so.*[1]

It is when we recognise this, and remember how all the forms of happy, vigorous life have sprung from the selection of those best fitted for

[1] For a more complete exposition of these arguments see Darwin's *Descent of Man*, chap. iv., in which the bearing of the struggle for existence upon morality was first laid down.

their existence, that we begin to ponder how far we are fulfilling the conditions of our life, and to value the lessons taught by the working of natural law. These have shown us that the two great necessities of self-preservation and reproduction have led, on the one hand, to the effort of each individual to succeed, and on the other to a mother's care, extending gradually to that sympathy and devotion to others which becomes in ourselves a strong motive power, urging us to seek the good of the whole living world. It is in the balance of these two instincts—the duty we owe to ourselves, and the duty we owe to our neighbour—that the moral conduct of life consists.

Let us take the lower ground first and consider how a man who thinks only of himself is yet forced, if he wishes to succeed at all, to obey to a certain extent the laws of right and wrong, because they have their roots in the very foundation of existence. Does he wish, for example, to enjoy life? then he must keep in bodily and mental health. We see that if a plant is hurried on too fast to flower and seed before it has stored up strength, it grows weak and dies early. So a young man who uses up his life

too fast, either by dissipation, or by overwork and privation, unfits himself for the struggle of existence. But there is a difference in the two cases: by work and self-denial he *is* preparing for life and gaining on one side, even if he loses on the other by want of judgment; in dissipation it is *all loss.* Turning night into day for pleasures which are only for the moment, burning away his strength with intoxicating drinks, wasting his manhood by irregular passions, he is inevitably incapacitating himself for a long and happy life. Nay, even if he prefers a "short life and a merry one," he is on the wrong road, for he is reducing his power of enjoyment both bodily and mental. Each excess lowers his vitality, each immoral action debases his senses, while it, nevertheless, creates a craving for that which has ceased to be a pleasure, and he becomes less and less fit to survive in the struggle for existence.

Such facts as these force themselves even upon the most selfish; but when a man's actions are chiefly harmful to others, it is not always so obvious how they recoil upon himself. Yet, if we consider a moment, we must see that if the self-regarding qualities of courage, strength,

ability, power of endurance, industry, perseverance, determination, and self-control, are weapons with which we fight the battle of life, so too are the altruistic qualities of truthfulness, honesty, justice, unselfishness, gentleness, and sympathy; for he who exercises these last invites and obtains the respect and assistance of others, while he who fails in them raises up antagonism, just as the unfriendly visitors to flowers raise barriers against themselves by the natural survival of those plants which possess the best means of protection. How a nature devoid of true sympathy and of a sense of justice to others may succeed for a time and then fail, is well exemplified in the life of the first Napoleon. Without any of the grosser vices he yet sacrificed first individuals, then nations, to his ambition, until, having roused the whole of the civilised world against him, he, though probably a man of greater ability than any of his contemporaries, was isolated like a dangerous wild beast till his death.

Yet how few men realise the inevitable result of injustice, of scant honesty, of untrustworthiness, or even of a hard grasping nature which lends no helping hand to others. We cannot look around without recognising that among

those who work there are many who think no harm, for example, of exacting a full day's wage and idling so as to do only half a day's work; of selling adulterated food so as to make a large profit; of scamping work done by the piece, and passing by a flaw which may ruin the machine of which it forms part. Again, turning to men of property, how many, of otherwise upright character and good social standing, will not hesitate to start a speculation, in which they themselves may gain much if it succeeds, and lose little if it fails, which failure, however, would involve the ruin of many; or to take advantage of the pressure of life to pay starvation wages; or of a large command of capital to create a monopoly, by which thousands suffer, to increase the wealth of one. So long as they keep within the law, not a few men would laugh to scorn the idea that they are not right in getting all they can, and giving as little as they must.

True, the voice of religion has always been lifted up against such actions. But how, if men do not believe that the eye of a just God is over them, or that it is forbidden to "grind the face of the poor," or to take unjust advantage of others? The answer of science is that these

commands of religion are not mere dogmas, but literal statements of the truth. The keen scrutiny of natural selection, the outcome of the laws of the universe which *are* the will of God, has never ceased to act since life began; and *imperfect and unfit work, whether in plant, animal, or man, renders that being less fit in the battle of life, while unfair advantage and hurtful actions toward the community create opposition which is a barrier to success.* The workman who slurs over his work, and the man who over-reaches his neighbour, are challenging the world to protect themselves against fraud, just as much as the humble-bee, gnawing the calyx of the Campion, challenges that plant to protect itself by an inflated or horny calyx (see p. 49); and the law of Natural Selection will as surely cull out and uphold the workshop in which honest work is done, and the shop in which honest goods are sold, as it does the healthy and the vigorous in lower life. Nor is this all, for a country, in which trustworthiness and honesty are losing ground, will be at a disadvantage in the competition with countries in which the moral standard is higher; and as the country suffers,

every individual suffers with it in the long run. Though "persons and events may stand for a time between you and justice, it is only a postponement. First or last you must pay your entire debt."

In like manner, the master who pays no heed to justice between man and man in the treatment of his work-people, or heaps up wealth unjustly, becomes a parasite draining the life of others without equitable return. He will accumulate wealth, but his own nature will surely deteriorate, and not only his own nature but the tone of the country in which he can so act and yet be approved of his fellow-men. The antagonism here, the self-defence to which the struggle for existence gives rise, will be the antagonism of those who are ground down; and in the bitter war of labour against capital, of poverty against vast wealth, the country and all in it suffer.

Have we not to some extent lost sight of this truth in the present day? In the rapid advance of civilisation during the last hundred years, have not the whirl of machinery, the spread of commerce all over the globe, the opportunity of making colossal fortunes, the herding together of men in our great cities, and the absence of

personal intercourse between those interested in any great enterprise, led men to neglect the human sympathy which ought to exist between employer and employed? Do we realise that even from the point of view of an enlightened selfishness it is to the interest of each to advance the welfare of all? Is not the habit growing upon us of treating men as money-making machines to be obtained at the least possible cost, forgetting that antagonism is always created when one living being takes from another without rendering back in due proportion, whether in kind, in gratitude, or in sympathy? Do not strikes and labour combinations, and our fierce social hatreds, warn us that in political economy, as in the science of life, the law of mutual help must work side by side with that of personal gain?

The question is no doubt a very difficult one, the interests involved are so many and the results produced so complicated, that even those who seek honestly and have ample experience, are often inclined in despair to give up the problem as hopeless. But at least it is something gained if we can establish from the laws of nature that to grind down those who work for us to the bare limits of subsistence, and to try to make the

balance even by charity, is only to create antagonism on the one hand, and parasites on the other; while the masses will also do well to remember that, even in plant-life, the store-accumulating perennials are not without their value, as affording shelter and protection against rivals and inclement seasons.

Meanwhile the spirit of "each one for himself," which is being woven into the very fibre of the present generation, is doing infinite harm for the love of self, already made strong enough by the battle for self-preservation, is increased until the narrow circle of one small life is all that each considers. Then it is that a man, step by step, loses sight of all his true relations to his fellow-beings, and either deteriorates into a mere lover of pleasure or gain, or drifts into crime. Many of the worst, because most cold-blooded and heartless, crimes of our day can be traced to this utter disregard of anything but personal gratification or gain. For when a man's own desires become the whole end and aim of his life, he does not hesitate to sacrifice others to them. Therefore, whether it is money, or position, or sensual gratification he seeks, the passion becomes stronger than all

other considerations, and he is led on to self-indulgence, deceit, and fraud, or even, when detection becomes imminent, to carefully planned murder to remove any difficulty from his path.

Such deliberate crimes, of which any one can recall instances from our daily papers, do not fortunately often occur, but they are startling proofs how necessary it is that natures which cannot be influenced by the higher law, which we shall discuss in the next chapter, should at least recognise that throughout all life a being wholly selfish is at war with the entire world, and must in some way or another suffer in the end. No doubt many will exclaim at this point that they themselves know selfish lives which, while sacrificing others, seem to escape all retribution or remorse; and this is no doubt true, for in many cases the "postponement" is long. But if the law be true, this is only an additional argument in favour of a point to be urged by and by (p. 116), that *in the end* they will have "to pay the whole debt."

Happily, however, this low motive of "self" is not the foundation of morality, for were it so, then, indeed, existence would be the cruel heartless struggle that some would even now

have us believe it to be, in which each would coldly calculate how much service to others would secure most benefit in return; and in which all the higher emotions of love, gratitude, self-devotion, and sympathy would have no place, since to rise upon the downfall of others would be the highest ambition of all.

But this is not so. We have as yet touched on only one, and that the lower side of the question. We have been considering the arguments which might influence such men as look upon "right and wrong merely as matters of expediency as to what will best serve their own ends," and have shown that even on these grounds they must be honest, trustworthy, just, and to a certain extent regardful of others, lest, having the laws of life against them, they should be crushed under the more vigorous and healthy natures.

For, as we shall see in the next chapter, the care of our "other-selves" has, from the very start of life, been educating living beings in the higher altruistic qualities, without which even the varied beauty of the plant world could never have been developed; which, in animal life, have gradually opened out the faculties more

and more to unselfishness and self-devotion; and which, in the ascending tide of human life, have become to us a faint foreshadowing of Infinite Love, Sympathy, and Fatherly Care.

It is the absence of this higher side which, above all things, makes bad men or women, for without it they are blind to the whole end and object of our being, which consists in finding our happiness in others, and all in God. And this can be founded as firmly on science as on religion (as, indeed, must be the case with all that is true), for upon it rests the existence and continuance of all races and species of beings from the beginning of time. Without self-preservation and the protection of the individual, life could not exist; without self-sacrifice and preservation of the young, life could not continue; and thus the actual existence of a world of living beings has its foundation in the service of others. It is when we turn from the depressing atmosphere of self to this higher instinct which seeks the good of all, that we mount from earth to heaven.

CHAPTER VI

"Duty! Wondrous thought, that workest neither by fond insinuation, flattery, nor by any threat, but merely by holding up thy naked law to the soul, and so extorting for thyself always reverence, if not always obedience; before whom all appetites are dumb, however secretly they rebel; whence thine original?" —KANT.

WE have seen in our last chapter that though men who are utterly selfish may, and must from self-interest, think of what is good for others, yet this calculating altruism can never deserve the name or assume the character of morality. We feel at once that the man who refrains from cheating his neighbour merely because "honesty is the best policy" is not at heart an honest man; while he who performs a generous act, reckoning all the while what he will gain in return, is not unselfish. To be really moral, needs a higher motive than this, a sense of duty, an enthusiasm for that which is good and noble. Can the laws of nature then have developed in us this earnest

sense of duty, which a true man *dares* not disobey, even though it curb his strongest passions and desires? Not only is it possible, but the whole scheme of the continuity of the universe leads us to believe that this, too, is the outcome of evolution, or the unfolding by natural law of the will of the Creator, showing that the foundations of morality were not laid merely in man, "upon whom the ends of the world have come," but in the very beginnings of life.

Even among plants it has been the necessity of providing for a future generation which has developed endless devices in the flower for the fertilisation and protection of its seeds; while in the insect the mother devotes her whole energies and risks her life to secure food and safety for the offspring which she will never see, taught by an instinct developed in the struggle for existence by the survival of those forms which best fulfilled these functions.

Is it wonderful then that, after long ages of inheritance, this instinct should become so strong as to impel even neuter bees and ants to perform a mother's duties to those who are placed under their care? And this work for others has no root in *self*, in the strict sense, except in so far

as the creature exercising it satisfies an instinct. The butterfly or the sphex gains nothing herself in providing laboriously for her young; and though, when we come to communities, the young bees and ants do in time become useful in the hive, yet it is clearly no calculation of this kind which makes the workers nurse and tend them, but an inner necessity stronger often than the preservation of their own life. So too in the higher animals this instinct, developed in both father and mother and inherited by the ancestors of man, acted but feebly at first in the savage, who cared only for his own family or tribe, but became strengthened, enlightened, and purified by ever-developing intellect, by the conscious love and care of parents, by the memory of sympathy given and received, and by the survival of those communities, races, and nations in which fidelity, justice, obedience, and similar virtues knit the members strongly together.[1]

And thus it becomes evident that the stern law of natural selection, though it often enables the strong, the selfish, the hard, and the exacting man to survive, just as it has produced the grasping parasite, the prickly thorn, and the

[1] See *Descent of Man*, chap. v.

bloodthirsty wolf; has also developed in far greater proportion the loving, the tender, the just, and the disinterested, as it has the mutual attraction of insects and flowers, the industrious law-abiding bee, and—aided by man, himself a product of the same laws—has developed out of the very wolf-tribe itself the faithful, devoted, and affectionate dog.

The moral nature then within us is no sordid balancing of debtor and creditor account between ourselves and our neighbour, but the true voice of the Creator, which has spoken from all time; saying first, "Parents love your children," and then to members of a social community, "Thou shalt love thy neighbour as thyself." And while this command expressed in natural law has played a large part in the production of all forms of healthy life, so also by virtue of it have communities existed. For mere self-interest, pursued without regard to the rights of others must, as we have seen, create antagonisms, and in the end would ruin any nation or country which acted upon that principle alone, or even one in which it outweighed the principle of mutual help.

Nor is this merely a feeling or emotion gratifying to the sentimentalist, for then it would be

useless in the struggle for existence. It is really the recognition of universal life as one great whole, of which we each as individuals form part, so that we cannot injure ourselves or our neighbour without, in so far, injuring all life, while the self-denial or suffering we may incur to benefit others enriches all, so long as it does not actually injure or debase our own nature.

And now we are prepared to answer the question how a man may hold his own in the struggle for existence and yet sacrifice much for the good of others; and this not with a view to ultimate gain to himself, but because duty prompts and his higher nature responds gladly. Surely by seeking to develop his own life in such a manner as to produce the greatest good for every living being.

The self-regarding virtues, such as self-reliance, courage, prudence, industry, perseverance, and temperance in all things, are essential to him; for we have seen that each individual must strive to live and flourish, and make the most of any opportunity to improve his own condition, and that, in the struggle for existence, no effort can be spared. Yet we feel instinctively that these virtues are higher when we exercise them for

the good of others as well as for ourselves, and temper them with the altruistic virtues of honesty, fidelity, justice, sympathy, mercy, and benevolence. We respect the resolute man who toils day and night, who gives up his pleasure for work, lives by rule, and sternly represses all excesses lest they should hinder him in attaining success, and when he has achieved it, we feel he has deserved it. But we estimate far more highly the man who exercises the same self-denial and perseverance for the sake of mother or sisters dependent on him; whose prolonged study has for its object the discovery of some truth by which the sufferings of his fellow-men may be mitigated and their condition improved; or who aims at being the master of some great organisation not chiefly for position and wealth, but because it gives him power to study great social and commercial problems, and to put on a surer footing the relation of man to man, class to class, and nation to nation. And the reason we value such a man more highly is because he aspires beyond the narrow duty of self-preservation to the world-wide purpose of good to all.

Though this purpose has been gradually worked out through all life, yet we cannot

call the lower animals moral or immoral, for they "follow the law but know not the doctrine." Held fast, for the most part, in the grip of blind instinct, they are examples of mechanical duty; while, except in the higher forms, they are probably never conscious of more than passing sensations. But man, emerging into self-consciousness, remembering and reflecting on past actions, and resolving upon future conduct, has to choose deliberately between conflicting emotions and interests, and by this conscious choice has a terrible power for good or ill. Thus impulse and reason, the love of self and the love of others, the gratification of appetite and sense, and the restraining influence of higher faculties, contend within him and make his inner life a struggle. As he can rise infinitely above animals, when by reason and judgment he acts in accordance with the higher laws of his being, so he sinks deplorably below them when yielding to gross and selfish desires, he chooses the ways of vice and degradation.

Which road he will take will depend chiefly on two things—on the cultivation of his intellect, by which he discerns the sequence of cause,

effect, and the consequences of his own actions and those of others,—and still more upon his moral nature, his sense of oneness with mankind, and with the whole of creation, which keeps him in touch with his fellow-men, with the universe, and with the Unseen Power which is breathing within him the breath of life. The man who has no sympathy, whose inordinate desires are strong, and his social instincts weak, is essentially a bad man; yet another may also act with bad results because, though his sympathy is strong, it is guided by a weak intellect.

The cultivation of the intellect becomes, therefore, a supreme duty, while the development of love and sympathy is equally imperative. By the cultivation of the first we recall vividly the memory of past actions, and reflect upon the consequences to which they have led; by the exercise of the second we render the memory of bad and selfish actions intolerable, and desire intensely to make reparation as far as lies in our power. And this is *conscience*, the voice of the law of God within us, which speaks far more strongly than the outer voice of the praise and blame of others. For these only read our motives imperfectly,

while we judge ourselves with the knowledge of the thoughts hidden within us; and this judgment becomes keener the higher our intellectual sensibility, and the deeper our sympathy with our fellow-creatures.

Nor are we left without guidance even from the outer world, for we have the history of past ages spread out before us. Far from being restricted to observations upon the life below us, we can study the science of human life by the light of natural law, and take example from those higher types which, from time to time, have risen above the level tide of man, and by superior intellect and more abundant sympathy have approached more nearly to the Source of both.

> "Lives of great men all remind us,
> We may make our lives sublime."

And in all countries and climes, from Buddha to Christ, and from the early Christian heroes to those of our own day, we shall find that the noblest natures, whether searching after truth like Newton, withstanding wrong and oppression like Abraham Lincoln, or going to almost certain death like Gordon, in the hope of being of some use to his "poor, ignorant, black children," have

all followed the law taught alike by science and religion, that he who devotes his life to duty is fulfilling the truest purpose of existence.

It is when we study the lives of such men as these, that we notice how closely morality is united to all true religion in whatever creed it is expressed; how in working for all we are working with God; and it is also then that the problem of evil existing in the world presses upon us most heavily. We have seen that this problem cannot be solved with our present imperfect knowledge. Why suffering and degradation should accompany the evolution of all good and happy life must at present remain a mystery to us.

The study of the struggle for existence does to some extent lift the heavy cloud hanging over us, by showing that all low thoughts and actions relate to the narrow life of self. They are the by-products of the effort of every being to hold its own in this life; and we have seen how such effort lies at the root of all progress, and of the very existence of varied and vigorous beings. But we have also seen that from the very beginning the love of our "other-selves" has tempered this instinct of self-

preservation, and since those, who in working out their own life work for the good of all, have been shown to be the fittest to survive, it follows that, in an infinite and eternal scheme, this higher mode of work must, in the long run, prevail, and suffering and evil must be gradually eliminated. Not, however, necessarily in this life, where our bodily restrictions are so great that the individual is always to a certain extent at war with the whole, and where the time is so short. If the full bearing of evolution is to be worked out, it must be in a scheme which embraces the entire universe.

This brings us face to face with the question of immortality which is so profound and so difficult to deal with from the point of view of science that the boldest might hesitate at attempting it. My only excuse for doing so is, that it is intimately connected with all higher morality, and that, therefore, it is a serious duty in those who believe they see a vista in science through things temporal to things eternal to state their convictions.

It appears to me that our intellect, our moral nature, and the conclusions of science, even apart

from religious belief, all point to a continuation of individual existence beyond the few short years we pass in this world. Our intellect carries us back through all phenomena to a first cause which, because in Him all things exist, cannot be other than omnipotent. It is impossible, and a contradiction in thought, to imagine that such a Power could be the author of an imperfect or unjust scheme, such as this world must be if those who, through inheritance or evil surroundings, pass lives of suffering, disease, misery, and degradation here, should live only their little span and pass away into nothing. A perfect scheme must be perfect not only in general results but in every minute detail, and though the pain and suffering around us are undeniable, and our limited experience makes it difficult for us to understand how they can have been necessary, yet as antagonism is impossible in an Omnipotent and Sole-existent Power (see p. 25), the only really logical conclusion is that they must, in some way unseen to us, be actually good not only for the universe as a whole, but for each individual.

So far is the argument of intellect and logic; our moral nature speaks next. To a thoughtful

mind it is not the longing for the prolongation of our own existence which makes a future life an imperative necessity, but a jealousy for the honour of the eternal Being of whom we form part—a conviction that "man cannot be more just than his Maker." Though selfishness and callousness to the welfare of others may linger in the lower strata of our nature, that which relates only to our individual self; yet our higher life, that which touches the universe, is strong in the sense of justice, sympathy, and mercy; and these qualities in ourselves, which we know can come only from the Source of all life, are an absolute proof that the Omnipotent Power, by whose laws we exist, must possess these qualities among His many inscrutable attributes; and that, since a just man would, if he could, redeem those who, in the struggle for life, have been too heavily weighted to rise, there must be a compensatory power in the universe which will, in the end, work out their existence to a just conclusion.

For this consummation continued existence is necessary beyond the present unevenly balanced life, and the strongest arguments for it lie in these conclusions of our intellect and moral

nature. Yet science too lends her aid, if only we will keep our minds fixed upon the truth that throughout all phenomena it is the underlying invisible energy which is eternal, the form which is temporary.

In the inorganic world we trace physical energy in various forms producing all phenomena, and in the organic world we find this same energy utilised in every living being in the building up of cells and tissue, and in the physical action of nerve and muscle. Thus, physical energy may be said to provide the necessary motive-power for living beings, in the same sense that plants provide the initial nourishment for the whole animal world. Yet this does not prove that animals have no higher existence than plants, nor that living beings are mere manifestations of physical energy. On the contrary, Professor Stokes, who of all living men is perhaps most competent to estimate what physical energy can accomplish, says: "Admitting to the full as highly probable, though not completely demonstrated, the applicability to living beings of the laws which have been ascertained with reference to dead matter, I feel constrained at the same time to admit the existence of a mysterious *something*

lying beyond, a something *sui generis* which I regard, not as balancing and suspending the ordinary physical laws, but working with them and through them to the attainment of a desired end."[1]

This desired end, as far as we can see, is individualisation transmitted by inheritance, and if we once arrive at the conclusion that science (as well as the common belief of mankind) recognises something in living beings apart from, and not convertible into, physical energy it matters very little whether, in the past ages of evolution, these two factors branched off from a common source, as plants and animals branched off from single living cells, or whether life has always been a separate and higher emanation from the First Cause. In either case this last has been the guiding power in all living beings, the *cause* and not the consequence of organisation; and organic growth, reproduction, sensation, perception, self-consciousness, and volition, although

[1] President's Address, British Association, Exeter, 1869. Professor Oliver Lodge has expressed the same conclusion briefly and clearly in his address this year to the Physical Section of the British Association: "The relation of life to energy is not understood. Life is not energy, and the death of an animal affects the amount of energy no whit; yet a live animal exerts control over energy which a dead man cannot. —Report in *Nature*, 20th August 1891.

always accompanied by molecular changes, can be conceived only as manifestations of life, just as heat, electricity, and chemical affinity are manifestations of energy. The mere dissolution of the bodily frame can no more destroy one than it does the other, while, however, there is this great difference between them, that whereas we know that the energy passes back in various forms to the sum-total which remains constant in the universe, the guiding control which we call "life," with all those wondrous powers which belong to it as the result of long ages of evolution, cannot, so far as our experience goes, be transformed, but passes out of the visible universe,—we know not whither.

It is true that those who do not believe in continued existence after physical death argue that we have no knowledge of conscious life outside of that which we term matter. It is possible they may be right, although, since matter, energy, and life are all alike mysteries to us, except through their manifestations, we cannot, I think, dogmatise far in this direction. But even if we allow their position, when can we declare that life would be "outside matter"?

Our only explanation of light reaching us

from distant stars is founded upon undulations of a supposed ether filling all space, and permeating all transparent objects upon our earth, and yet absolutely invisible, imponderable, and intangible to us, so that its existence has not as yet been verified by any experiment. If we need a hypothetical material pervading all the visible universe to account for the transference of physical energy which, we know, takes place across space to and from our solar system, why make a difficulty as to the possible passage of life into the far beyond?

This is, however, only a suggestion in answer to an often-made objection, and carries us beyond our point, which is that life, being the cause and not the consequence of organisation,[1] does not depend upon it for a continued existence; and that, since all those qualities and idiosyncrasies, which constitute our inner self, are manifestations of life, they cannot be affected in any way, beyond mere outward expression, by the dissolution of the bodily frame. Long before physiological

[1] The German philosopher Wundt says: "The psychical life is not the product of the bodily organism, but the bodily organism is rather a psychical creation in all that, by its purposive power of self-regulation, gives it precedence over inorganic bodies."—Quoted by Dr. Mivart, *Truth*, p. 426.

science had reached its present stage, Bishop Butler, in his *Analogy*, emphasised this point; and one of our greatest living biologists, though himself not hopeful of the future, pointed out the argument to me, and acknowledged that it had never been refuted, and so far as he saw never could be.

If we are constrained, then, to look upon life as an ever active force working from the lowest to the highest form and in itself indestructible, are all living existences to continue? This is another point upon which it is impossible for us to form a definite conclusion, because even in this life individuality exists in very various degrees. The individuality of the plant is infinitely inferior in grade to the individuality of the animal, just as the life of the insect is not comparable to the self-conscious life of man; but as Bishop Butler again pointed out, the continuation of all life is the only logical conclusion, and the universe has surely room and work for all grades of the living principle.

Startling as this may appear at first sight it becomes less so when we reflect that suffering and struggle have existed from the beginning

of life, so that in all sentient beings annihilation would leave an unjust balance. The same argument applies here which was used with regard to our appreciation of the intelligence of animals. Everywhere an increase of knowledge leads us to see continuous gradation throughout all life, and to acknowledge that we are only beginning faintly to comprehend the possibilities of nature.

But while this consideration must lead us to a much deeper sense of our duty towards animals than is commonly felt, it does not seriously affect our estimate of that individual responsibility in the case of human beings, which concerns us in dealing with the question of morality. It is the continuity of the life of each individual man, with its qualities and idiosyncrasies, which becomes of such vast importance if the arguments urged above are sound. For, as in this life, the vast superiority of man in his power of abstract thought, spiritual apprehension, and moral resolve, makes him the arbiter of his own success or failure, so his power of anticipation of a future life gives a new and overwhelming impetus to his moral nature. On the side of self-preservation alone it warns him that the

consequences of his actions are far-reaching, and that the penalty which he seems to escape here is "only a postponement. First or last he must pay the whole debt."

And here we have the answer to those who urge that an enlightened selfishness may enable a man to further his own ambition and indulge his vices at the expense of others, and yet escape unpleasant consequences himself and enjoy life to the end. He may, indeed, do this when a less astute egotist would bring a speedy retribution on his head; but none the less he is storing up in his nature elements antagonistic to the good of all, and as such elements are least fitted to survive in an ever-progressing evolution, sooner or later the consequences must react upon him—the narrow self at war with higher life must be crushed out.

On the other hand, what an impetus is here given towards a higher and nobler life for ourselves, and self-sacrifice for others! If we are willing to labour and spend ourselves to mitigate the sufferings and better the condition of our fellow-beings for a few short years, how much more then, if we feel that the wretched state of their existence is dragging down the life which

should be progressing, and learning all that can be learned here, before passing into a wider sphere.

For in this as in all else we cannot escape from continuity. That which the individual life has gained or lost in the struggle here must characterise it in its onward path till a wider experience and emulation has developed the nobler and stifled the narrower and lower instincts.

Using the faculties he inherits, and working out his inner self by the experience he derives from the conditions under which he lives, man is moulded on this earth for good or for evil. It is no doubt depressing to contemplate how many leave it degraded by lives of self-indulgence or grinding misery. Yet none, not even the grossest sensualist, or the most hardened criminal, was ever without some spark of higher life, some love for a little child, some generous feeling towards those who have not cast him out in his degradation.

And when we carry on the life-principle into the boundless universe, and remember that the slightest spark of good must survive since it is of value to all, while, as we have seen, evil must

be eliminated as injurious to all, then the pessimism induced by contemplating the ills of this life, is replaced by a patient optimism. For hope goes on before us, justifying the highest promises of religion in all ages, and we can dimly foresee how, through the action of ever-widening sympathy, the narrow boundary of self will break down more and more till our own individuality will survive only to be merged by sympathy in that of others. When that time comes, as surely it must, we shall realise at last that we are indeed but individual fractions of One Universal Life.

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